

Wirginia Wildlife

Dedicated to the Conservation of Virginia's Wildlife and Related Natural Resources and to the Betterment of Outdoor Recreation in Virginia

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COVER: This female wood duck was "shot" by wildlife photographer Karl H. Maslowski as she emerged from her nest in a natural hollow in the trunk of an old tree. Wood ducks, common in Virginia, are at home wherever there are trees and quiet fresh water. National Wildlife Week this month spotlights the necessity of preserving wetlands for waterfowl (see page 14).

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Is It "Wise Use" To Prohibit Hunting In Parks?

ONE definition of natural resource conservation currently in vogue is the catchy little phrase, "wise use without abuse." Most folks will go along with this definition, but the "going" gets tough when we try to apply it to specific situations. Here's an example: Is the wildlife resource present on our public parks being "wisely used" under present regulations prohibiting hunting on these areas?

The national parks have been wildlife refuges since their inception, and hunting and carrying of firearms in our Virginia state parks is "strictly pre-hibited."

Conrad L. Wirth, director of the National Park Service, has stated that "public hunting is neither the appropriate nor the practical way to accomplish national park and national monument objectives (and) is irreconcilable to national park and national monument purposes." No ifs, ands or buts about it.

The prohibition of hunting is unimpeachable for historical sites, the geologic wonder-type parks where wildlife populations are small, and for true wilderness areas where natural predator-prey relationships have not been interfered with.

But the morsel we are attempting to fish out of the boiling cauldron of resource management controversies for closer inspection here is the proposition, advanced by sportsmen in the elk-glutted Yellowstone National Park area among others, that private sportsmen should be allowed to harvest overabundant game on park lands instead of permitting only park rangers to shoot the animals, live-trapping the animals at great expense and shipping them elsewhere, or simply letting the animals eat themselves out of house and home and die of parasite infestation and starvation.

We can't help feeling that if those who oppose hunting in parks were consistent in their thinking they would oppose all other man-made interference in parks including fishing, predator control, fire protection, forest disease control, road construction, and hotel building.

Why? Because fishing, like hunting, results in the removal and utilization by man of the annual surplus produced by wild animals each year, interjecting man into the parks' aquatic food chain picture when he cannot so interfere in the upland food chain. Because predator control to protect park guests and increase prey species leads to unnatural overabundance of such species as ground squirrels, rabbits, and deer. Because fire protection results in the elimination of the prey species' natural feeding areas—the brushy "burns." Because forest disease control—the spreading of poisons to kill tree-destroying insects—kills fish and wildlife. Because the construction of roads and buildings permanently eliminates wildlife habitat.

The concept of the "sanctuary" for upland game is obsolete. Biologists have found that most wild animals have extremely limited "home ranges" and do not move out of sanctuaries to repopulate neighboring areas as was once believed. The world of the cottontail rabbit is less than 10 acres. Undisturbed gray squirrels and deer get all their food, water and cover in 100 acres or less, and bobwhite quail range over less than 200 acres per year. What does happen on wildlife sanctuaries—and the problem is compounded by predator control, fire protection, and the absence of occasional timber or pulp-cutting operations—is that wildlife populations suffer more violent population fluctuations than they do in areas open to hunting. Game populations build up, the food supply is eaten, the weakened animals are attacked by parasites, and a short spell of bad weather may wipe out the entire population. After the die-off and many years of range regeneration, the animals may stage a comeback. In areas open to hunting, game herds are more apt to be kept within the carrying capacity of the range and thus remain healthy.

We are not suggesting that the quarter of a million acres administered by the National Park Service in Virginia and the 25,000 acres administered by the Virginia Division of Parks be thrown open to uncontrolled public hunting tomorrow, although, if this were done, there would be little conflict between hunters and picnickers because they "come forth" in different seasons.

We do feel, however, that the position on this matter taken recently by the International Association of Game, Fish and Conservation Commissioners is worthy of serious consideration. This association maintains that express provision should be made for state management of fish and wildlife resources—including hunting when appropriate—when new units of the national park system are established.—M.R.C.

Re: VALC Game Law Proposals

IN your January 1962 issue of Vircinia Wildlife... one proposal to change our hunt laws is, "a provision permitting property owners to institute civil proceedings to recover damages of \$50 from those who trespass upon their property." This, I hope, goes into effect as early as possible to help those of us who have land posted and are unable to keep hunters out of our pastures and lots we have cattle enclosed in. I don't know why people will run over a person's farm as though they owned it, but I think they just forget they are human beings or something.

Mrs. Walter F. Davidson, Sr. Dillwyn, Virginia

IN regard to the editorial "Giant Steps" in the January issue of VIRGINIA WILDLIFE, I think the proposal to adopt uniform seasons and bag limits is a very good thing and should have been done long ago. Second, I think the provision permitting property owners to institute civil proceedings to recover damages of \$50.00 from those who trespass upon their property is all wrong. This law would be greatly abused and would be used by many as a means to picking up a fast buck. It would be the case of the person who is willfully trespassing seldom being caught, because he is always on guard and watching. The innocent person who accidentally got a foot over the line would have to pay the price. If this proposal were passed, it should be compulsory to post the land every 50 yards on all boundaries with plain posters signed by the landowner to be eligible for the \$50.00 damages.

Third, a prohibition against carrying a loaded firearm of any caliber upon the highway or near it, to my idea, is also all wrong. It is much safer to be standing at the edge of the road where you can see what is coming from either direction and shooting away from the road than it is to be standing 100 yards back in the brush where you cannot see the road or what is on it and perhaps shooting toward it.

My last gripe is again pertaining to the snow law. . . . The commission has authority to curtail or close the season on a species when an emergency arises. For instance, they could have closed quail season early in (southwestern Virginia) and not penalized the rest of the state on all the hunting.

Now they want to bring in a professional trapper to trap foxes and skunks in Fluvanna County; yet, if I was to shoot a fox in the snow off my property, I would be fined. Why not do away with all the snow laws and let the foxes be taken care of by the sportsmen? I think the skunk is most beneficial in the grubs and insects that he eats.

Howard C. Scheier Palmyra, Virginia

I READ with great interest your editorial, "Giant Steps," in the January issue of Vircinia Wildlife and, with one exception, I wholeheartedly agree with your endorsement of the VALC recommendation. I view with

(Continued on page 26)

OF BIRDS AND BEEF

By JOHN H. McLAUGHLIN Staff Assistant

WISE MAN once said, "He is not only idle who does nothing but he is idle who might be better employed." Believe me, old "Bossy" could be far better employed than spending her time associating with the woodpeckers.

Now the woodpecker is a fine and noble bird—as long as he's not tapping out "sweet nothings" on your metal downspout—and the cow—well, we don't have to prove her merits. The point to be made here, however, is that these two fine beasts have practically nothing in common. Yet, would you believe that they are compelled to live together in 35 percent of the private woodland in Virginia's 22 westernmost counties?

Census reports for 1959 showed that there were 1,434,223 acres of private woodland in this area and that 402,876 acres of these were being grazed. This practice is strongly denounced by the three professional groups concerned. The livestock specialist says it is poor beef management, the forester can show you that old "Bossy" is chewing dollar bills right out of your hip pocket, and the wildlife biologist says that quail can't nest in a cow track.

Let's take a close look at the reasons why the professionals feel this way.

The Livestock Specialist's Argument

When a man has beef cattle on a tract of land, they are usually his major concern on those acres. He wants them to produce at their highest capacity. Thus, he must insure that the feed that goes into them is of a quality that will add pounds rather than simply maintain their weight or even cause them to lose weight.

The present beef market is so competitive that many live-stock specialists frown on the use of block salt as compared to the granular form. Their contention is that the cattle spend too much time licking their salt requirements from a block. This requirement could have been mct in minutes with the granular form and the rest of time spent eating and thus putting on pounds. By the same token, cattle will stay in the woods for shade and relief from insects and eat materials that to them are scarcely more than filler. This seems about as wise as the old fellow who ate dried apples for breakfast, drank water for lunch, and swelled up for supper.



Commission Photo by Kesteloo

The trampling of cattle tends to destroy the protective litter and humus layers of the forest floor. The soil is packed down, tree growth is reduced, and wildlife homes are eliminated.

Studies in Illinois show that nearly 18 acres of woodland are needed to *maintain* the body weight of a 700-pound steer. One such steer *lost* 75 pounds by July 20 on 12 acres of woods.

The U. S. Forest Service has been counting bovine calories at their Coweeta Hydrological Laboratory in North Carolina. In one experiment an average of six head of yearling cattle were grazed on a 145-acre wood lot from May to September for 13 years (1941-1953). An adjacent seven acres of seeded pasture was also available to the cattle. In 1950 six more acres of pasture were added. The cattle were weighed individually at periods throughout the season and different stock was used each year. The cattle were grazed solely on the woodlands the first year. They gained weight during the early part of the season but began to lose weight in August. Beginning with the second season, they were alternately grazed in the woods and in the pasture. From 1944 to 1953 they were also fed a supplement of grain and cotton seed meal. Despite the additional pasture and feed, the pattern was constant. The cattle made moderate gains in the early part of the season but lost weight toward the end.

One principle back of these findings is that cattle will eat many indigestible materials. Much of the pure cellulose they engorge from a wood lot fills them up and satisfies their appetite when they could have eaten quality food. More and better feed could be obtained by improving one acre of present pasture than by turning the cows into six acres of open woods.

A few years ago experiments were conducted on the use of peanut hulls and molasses as feed. The cattle ate it readily but lost weight on the ration. This underlines the fact that cattle don't always know what is best for them. Many cases are on record where cattle were lost or expensive veterinarian bills resulted from their gorging themselves with acorns. Acorns are so heavy that there is difficulty in their passing from one compartment of a cow's stomach to another.

Another hazard involved in wood-lot grazing is the fact that many plants in the woods, such as wild cherry, Dutchman's breeches, lupine, mountain laurel, black nightshade and asters, are poisonous to cattle. The price of one lost cow could have built quite a stretch of fence.

Moral: When your cow asks for grass, don't give her a sawlog.

The author, a graduate of the Virginia Cooperative Wildlife Research Unit at Virginia Polytechnic Institute, served as district game biologist and supervising game biologist in southwestern Virginia for seven years prior to his appointment to the director's office as staff assistant on January 1, 1962.

The Forester's Argument

To a forester, a cow in a wood lot is just about as welcome as a bullfrog in a punchbowl. From the timber management standpoint, the detrimental effects of grazing are many. The cattle destroy the forest reproduction, compact the soil, cause erosion, and finally retard the growth of the standing trees.

The most obvious sign of grazing in the wood lot is the absence of young trees which have been devoured. A sound forest management program insures sustained crops of timber. This principle depends on a continuing supply of young trees to replace those that are harvested. The constant destruction of the forest reproduction (or the infant generation of trees) will do to the forest what Pharaoh tried to do to the Jewish nation by destroying all the male children. The low shrubs which form the ground cover leave the scene by the same route as the young trees. This ground cover is vital to the forest. It protects the soil from drying winds. Its roots hold the soil in place, preventing erosion and contributing to the spongy water-holding qualities which make up a healthy forest soil. The absence of these ground cover plants allows the dead leaves and organic material from the trees to oxidize more rapidly. Thus grazed wood lots often have no spongy leaf mold layer. This crucial layer normally holds moisture and contributes to the soil fertility. It is from this layer that the soil derives its organic material. It is here that most of the myriads of microscopic plants and animals live that unlock many of the plant nutrients.

Most of the wood lots in western Virginia are on land classified by the Soil Conservation Service as Class Five land. This means that the land's best possible use is the production of forest products. Much of it is good soil but lies on slopes too steep to cultivate or pasture. One could say, "If the land is as steep as a bull's face, keep him off of it!"

Here, then, are the basic ingredients in most of our grazed wood: packed soil, lack of ground cover, absence of adequate humus. When we combine these with a steep slope we can easily visualize the condition. This situation makes a tin roof a piker when it comes to shedding water.



Commission Photo by Kesteloo
"When your cow asks for grass, don't give her a sawlog." Cattle left
to forage in wood lots soon require supplemental feeding to maintain
their weight.



U. S. Forest Service Photo An ungrazed wood lot provides flood and erosion control, a continuing supply of timber, and abundant wildlife food and cover.

In Wisconsin it was found that in steep grazed woods the water runoff was 295 barrels per acre per year. In steeper ungrazed woods the runoff was only six barrels of water per acre per year. From the water management standpoint, the steep ungrazed woods holds more water than grazed pasture on the same slope. In steep grazed pastures, the runoff was 92 barrels per acre per year.

Did someone say. "Why did my spring go dry?" or "Who shortened the rope on my well bucket?"

We all know that when water runs, it doesn't run alone—it carries something with it. In our part of the country it is usually the mother of our nation's breadbasket—topsoil.

The more sneaky and less obvious result of beef in the brush is the effect on the standing trees. Soil compaction from cattle damages the tree's feeder roots in the upper six inches of soil and can cut tree diameter growth in half.

Moral: The green material in the corner of your cow's mouth may be a leaf—or it might be a dollar bill.

The Game Biologist's Argument

It is possible to destroy 90 percent of Southwest Virginia's existing farm game habitat by grazing 10 percent of her wood lots. At the present time almost every available acre is grazed to some degree. In our changing times we have witnessed the disappearance of rail fences, hedgerows, fallow overgrown land and weedy strips adjacent to crop land. Thus the last citadel for our farm game is the wood lot. To be more exact, we should say the edge of the wood lot.

It is a well-known fact that the edge or border of the woods is the most productive game range. This results from the variety of plant cover types existing in close proximity. In a distance of 50 feet one can go from most nut bearing trees to fruit-producing shrubs to seed and forage-producing weeds and grass. In this diversified situation game find food, nesting cover and escape cover within easy reach. This narrow fringe of variety encircles the woods and is not afforded in the interior of the wood lot. It is the lifeline of most of our farm game. When we look at a grazed woods we find that the heaviest use by cattle is invariably that portion which borders the pasture or the edge. This is the cow's favorite loafing ground, and it doesn't take a keen observer to notice that every available sprout, twig, and shrub are gone. The ground looks like a hog lot and a fence lizard would have to pack a lunch to cross it.



U. S. Forest Service Photo

When closely grazed, steep mountain land loses its ability to absorb rainfall, and flood peaks, along with erosion, increase sharply.

It is for this reason that one could destroy the largest percentage of game range by grazing the 10 percent of the woods that form the perimeter. The grazing of this edge has all but eliminated game's last-ditch stand on many of our farms.

The forest reproduction and the shrubby ground cover mentioned earlier are absolutely essential to ground-inhabiting game. The interior of the woods has never been very productive of small game and even light grazing can eliminate its existence there.

Moral: Unlike cowbirds, quail don't follow cattle.

Conclusions

Most of the land-use changes in Southwest Virginia have accompanied the skyrocketing rate of beef production. In most cases close analysis would reveal that the wood lots have contributed very little to this success story. It would be utterly foolish to give a livestock farmer the choice of raising a covey of quail or a herd of beef. That is not the intended purpose here. The point is that game would get a fair shake if a man merely looked at the situation from the cold economic viewpoint and fenced his woods. It is granted that shade is important in beef production. Various studies have proved that insignificant things such as lice, ticks, insect harassment and heat can interfere with weight gain in cattle. Shade can be provided by fencing cattle into adequate portions of the woods and fencing them out of the rest. Fences constructed 10-20 feet inside the woods destroy the edge effect. From the wildlife standpoint, when planning shade for beef it is far more desirable to enclose blocks of the woods with the pasture and then fence the remaining part at the edge of the wood lot.

Fencing is certainly a bitter pill, but the Agricultural Stabilization and Conservation Service has sugar coated it. They make payments to farmers for fencing forest stands. For barbed wire construction in established stands where posts from the stand are used, they pay \$.27 per rod, and \$1.25 per rod is paid where posts are not available. For woven wire construction, they pay \$1.95 per rod. This does not apply to line fences or those between cultivated fields and woods. The construction of such fences must be supervised by the Virginia Division of Forestry to be accepted.

The fencing of wood lots could be the one practice that would do the most for game in Southwest Virginia.

Don't Crow, Brother Crow

By JOSEPH CURRERI Philadelphia, Pennsylvania

ERE are many ways of cutting the rope of tension that ties people to their work. Any man who finds a successful and harmless escape finds that it eases away cares and fatigue, stimulates appetite, makes food taste better, and brightens the outlook, and he will return to tackle problems with renewed vigor.

Hunting has, and always will be, my escape from day to day living. I have found a retreat in southern New Jersey, where I spent the happiest of days. I found the one sort of sport with the gun I cared for; a sport accompanied by tranquil charms with which many city dwellers are unfamiliar. I call it my Shangri-La.

Imagine a sort of small round construction sunk into the ground, and rising a little more than three feet above it. This hut, built up with loose stones, is roofed with tiles, which are hidden as much as possible by sprays of ivy. You might take it for a ruined tower razed near to its foundations, and hidden in the grass.

The narrow space within receives light from loopholes. Tall dead trees are planted round the retreat, and at the foot of them are the decoy birds, whose business it is to attract those that are free.

The tactics are simple. The sportsman quietly shuts up, smokes his pipe and waits. He watches the dead trees through the loopholes. Then, when a bird perches on a dry branch, he methodically takes his gun. rests the barrel on the edge of a loophole, and annihilates the creature.

My favorite time for hunting is winter. When winter comes and begins to throw his weight around to show he really means business, and the grouse and quail are but a memory, hunters' thoughts turn to a bird of quite another feather. For this is the time of year when half a million sportsmen sally forth to pit their wits against one of the smartest, toughest, and most resourceful birds—that inky black concentration of arrogant intelligence, the crow.

There is no doubt that keen enjoyment is to be had on a crisp winter morning when the frost is on the ground and the game is crows. Those who know the pulse-quickening smell of gun smoke in the still air will never forget it.

Without that dark sentinel in his treetop, the winter's sky would be vacant. Crow shooting is a good way to make friends among farmers. Shocked corn and winter wheat become the crow's main winter feed.

Crow shooting is sporting and sharpens your shooting eye. There is no closed season on crows. They are practically the only game-type bird legal to shoot in the winter. A lonely black bird perched in a dead treetop, leaning against the biting wind, is often the only sign of wildlife in the field. A sentry crow will always be on guard to warn the flock when any danger appears. He warns the flock with three or four staccato cries repeated at short intervals—the alarm signal. These big black birds have the wits needed to survive.

Its large size and a jet-black uniform makes it almost startlingly prominent. Man's hand is ever against it, yet it caws derisively and flaps away in safety almost every time. It is incredible the way crows make crime pay. And yet, if it's not your corn that has been stolen or your nestling robin that has been gobbled, you can't help admiring their skill and daring. Henry Ward Beecher gave us the best summation of this sable fellow's intelligence when he remarked that if men wore feathers and wings a very few of them would be clever enough to be crows.

I came across my retreat quite by accident when I was a little boy. It has been undisturbed all these years. Being alone this way, miles from any other person, refreshes me. The sounds are still mainly of birds and breeze against the solitude; rarely is there the howl of machinery, the smell of burnt, oily asphalt or the wail of a police siren.

Here, in my limited hunting ground, rabbits and quail are rare. If, by a miracle, a rabbit passed between my legs I watched it run with righteous astonishment, so little was I accustomed to meet with such creatures. I remember a covey of quail getting up one morning in front of me; I remained so stupefied at that loud sound of wings, that I discharged my gun without aiming, and peppered a telegraph pole.

Besides, I acknowledge that I have always been a wretched shot. If I have killed a good many crows in my time, I have never been able to down a great horned owl.

That is, no doubt, why I prefer shooting in ambush.

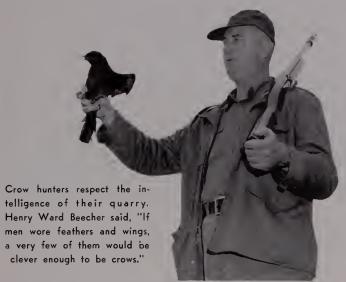
I usually set out at three o'clock on dark, dreary mornings. I park my car, and then walk three miles in the dark, loaded like a mule, for it is necessary to take the decoy birds with you. I feel that decoys help draw crows. Hunters differ on the best type of decoys. Some prefer to hang in a tree a cage containing a cat, for crows will fight cats. Another decoy is the crow's most hated enemy, the great horned owl. In some areas it is legal to use a live owl but an imitation may be used for a decoy. It is staked out in open view of a crow flyway. When a flight is sighted, the alarm call is given: three or four harsh cries, followed by a sounding call like an angry crow telling an enemy off. The enraged crows will dive-attack the owl straight into the muzzle of the hunter's gun.

I always use about a dozen decoy crows. They are made of balsa wood and staked into the ground at various intervals. Add to that a few hearty and vibrant caws, sounding the alarm signal, and answering crows come fast as your call grows in volume and excitement.

When I reach my destination it is still dark, the land expanded, broad, savage, in a mass of gloom, with its multitude of gray, scrubby bushes. All around me, in the darkness, I hear that murmur of the pines, that great confused voice, which resembles the lamentations of the waves. I do not always feel very comfortable. It is already an emotion, a palpitating pleasure that I am experiencing.

But I have to be quick, Crows are early birds. I plant my decoys and shut myself in the hut. It is too soon as yet; I can not distinguish the branches of the dead trees, I light a fire in the fireplace and grumble, hastening to get a bright blaze that shines rosy on the cinders. As soon as the sport begins not a bit of smoke must issue from the hut. It might frighten away the game. Brother crows are not to be taken lightly. Flock leaders are sage old characters that can sense a hunter miles away. While waiting for daybreak I grill mutton chops on the embers.

I go from loophole to loophole, searching for the first pale glimmer of daylight. "Nothing yet," I mutter, My eyes peer into the darkness, I do not rely on my eyes alone; I listen. The silence is disturbed by a thousand sounds, those whis-



Commission Photo by Kesteloo

perings, those profound sighs of the earth at its awakening. The bare limbs of the dead trees are dimly distinguishable. The wail of the pines increases and, at times, it seems to me as if congregations of crows are about to swoop down upon the hut, cawing furiously.

But the clouds are becoming milky. The dead trees stand out in black against the clear sky with singular distinctness. Then all my faculties are strained, and I am bent double with anxiety.

"Now is the time." I yell to myself. I go into my battle cry. "Caw-Caw-Caw."

How my heart leaps when I suddenly perceive the large silhouette of a crow on one of the dead trees!

"Steady, old boy," I clutch my semi-automatic shotgun with the utmost precaution. "Don't knock the barrel or stock against anything," I warn myself. "He must be the sentry. I mustn't miss him." The crow stretches out its neck, shows itself off to the first ray of the sun. in the stream of morning light. He stands there in a tomb-like, accusing, defiant silence. I aim carefully and fire. The bird falls. He dies defiantly. I do not go to pick it up; that might drive away other victims.

And I begin to wait again, agitated by a feeling of excitement similar to that of a gambler who has had a lucky hand, and is in doubt as to what chance may have in store for him. All the pleasure of this kind of sport is in the unforeseen, in the willingness of the game to come and be slaughtered. Will another crow or flight of crows perch on one of the dead trees?

I see the little hut again now, and a fresh perfume of thyme and lavender comes from the country side. The wind whistling softly amidst the decoys with the loud rustling of the pines in the background. The sun shows a lock of its flaming hair on the horizon; and there, on one of the dead trees, in the white light, brother crow stands motionless.

I'll see that little hut again, but only in memory; for soon it will no longer be in existence. It is due to be annihilated together with the woods I loved. A new housing development, with small ranch houses, precisely spaced, will stand where I spent my happiest of days. Hot asphalt highways will send each sleek car to split the woods that I once knew.

But don't start crowing, brother crow. Eliminating my secret hut isn't going to stop me; for come this winter. I'll be again among those half a million sportsmen sallying forth to train our guns on you—old brother James Q. Crow.

MARCH, 1962



Southeastern Cooperative Wildlife Disease Study Photo

This grim scene occurred last winter on an area of high deer concentration in Maryland. Field Biologist Charles M. Marshall (left) and Project Director Frank A. Hayes observe a few deer that died from a combination of malnutrition, starvation and parasitism.

Unwanted Deer Hunters

By ELIZABETH ETHERIDGE

OUR years ago wildlife conservation authorities of 11 Southeastern states joined forces with the U. S. Fish and Wildlife Service to seek out an unwanted deer slaver.

They wanted to know what caused periodic die-offs in the region's white-tailed deer herds—die-offs which sometimes claimed so many animals that hunting was poor for years to come if not absolutely prohibited because of the shortage of animals.

The agency the states set up to investigate these baffling die-offs was the Southeastern Cooperative Deer Disease Study. This regional organization is sponsored by Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia, with headquarters at the University of Georgia's School of Veterinary Medicine.

The search began; clues were collected and fitted together; and now answers are beginning to emerge.

Officials at the Study—which now substitutes "Wildlife" for "Deer" in its title because its activities have been greatly broadened—are careful to say "beginning to emerge," for there may be new evidence to turn up later, but at least they feel that they are on the right track.

It appears that there is not just a single killer, but many. They are parasites, the major offenders being round worms, tape worms, flukes, bot flies, and lice with which a host of other organisms work their way into an animal until it sickens and dies.

In all the deer die-offs in recent years in the Southeast, significant numbers of both internal and external parasites have been found. They gain their best foothold in deer when the deer themselves become so numerous that the area they occupy is inadequate to supply their needs. When the natural browse and mast crops, or acorns, are gone and deer get

hungry, the parasites have a good opportunity to move in and take over. They seldom miss the chance.

The staff of the Southcastern Cooperative Wildlife Disease Study has been looking for these deer killers all over the Southeast from the bayous of Louisiana to the highest mountains of the Carolinas. They call them "a new kind of deer hunter," which abide by no laws, recognize no seasons, and are governed only by their voracious appetites.

To date 12 different kinds of potential deer killing parasites have been found in the Southeast. They are brain worms, gullet worms, stomach worms, nodular worms, whip worms, lung worms, tape worms, liver flukes, rumen flukes, nasal bots, biting lice, and ticks.

All can be deadly. In the first place, parasite infection results in a marked reduction in the deer's body weight and antler size. In the second, they take a heavy toll on the vitality and reproductive potential of these animals. Finally, they take the animal itself. Dr. Frank A. Hayes, Director of the Study, estimates that within the past year stomach worms and lung worms alone have harvested more deer in certain areas than all the hunters put together.

In the Southeast in 1960 there were three significant instances of deer mortality in isolated areas of Maryland, Mississippi, and North Carolina. In each case the mortality appeared to be intricately associated with heavy parasitic infections, and on each occasion there were more deer in the area than there was natural food available for them to eat.

In Maryland, for instance, the deer died as a result of the combined effects of starvation, stomach worms, biting lice and a bitter cold winter. The deaths were concentrated among young deer who could not compete for the remaining food, deer crippled by automobiles, and those animals weakened by nature. A long siege of deep snow triggered the die-off.

During December 1960, on a private hunt club in the delta region of Mississippi, a five-and-a-half year old doe was found in an extremely weakened condition. Because of obvious signs of illness, this animal was killed and a careful necropsy was performed. A large number of adult lung worms were found in the air passages and a diagnosis of verminous pneumonia was later confirmed in the central laboratory. The lung tissues were riddled by the larval forms of this parasitic species. A few months later, approximately 30 dead fawns were found in the immediate area. Heavy stomach worm infections were found in three subjects that were examined. It appeared that both lung worms and stomach worms had contributed to the deer deaths.

In late winter and early spring of this year, 73 dead deer were found in three lonely and isolated coves in the North Carolina mountains. Nine representative deer specimens were procured and the lungs of each were found to be torn apart by the larval forms of lung worms. This was considered evidence enough to suppose that these parasites had contributed heavily to the die-off. Stomach worms were also found, with as many as 6,000 being collected from a single deer.

It is of particular interest that there was a definite correlation between the number of stomach worms found and the bone marrow fat content of each deer: the more stomach worms present, the lower the percentage of bone marrow fat.

Members of the Wildlife Disease Study staff were on hand to investigate each of these instances of deer mortality. They collected animals that had died and made complete or partial necropsies of each. All gross lesions were recorded,

VIRGINIA WILDLIFE

Miss Elizabeth Etheridge received an A.B degree in Journalism from the University of Georgia and served as Assistant News Bureau Director at the University until September, 1961, For several years she devoted much of her time to information work for the Southeastern Cooperative Wildlife Disease Study.



Virginia Game Commission Research Biologist Jack V. Gwynn (left) assisted Field Veterinarian Theodore R. Ridgeway (center) and Field Biologist Marshall in their check of Dismal Swamp deer for parasites last October.

and tissues from many organs were preserved for microscopic examination at the central laboratory.

They also looked for systemic fungi infections, attempted isolations of infectious bacterial and viral organisms, and searched out toxic substances in either the stomach contents or animal tissues. Many parasites were also collected from each animal and these were later identified.

From these methodical and rather extensive studies, only the parasites could be singled out as the cause of the three consecutive white-tailed deer die-offs. The significance of these guileful and insidious creatures was apparent: They are the "unwanted hunters" in the Southeast, hunters which are sure to play a significant role in game management practices in the future.

Before the Georgia veterinarians and biologists began their study of deer diseases in 1957, very little was known about deer parasites in this region. There are still many unanswered questions. Where do the parasites come from? How are they carried? How do they get into deer? What can they mean for deer hunters in this region? The answers lie in intensive research.

Such research is expensive for one state to carry on alone. That's why 12 Southeastern states and the U. S. Fish and Wildlife Service joined forces to support a regional program. The staff of the Study now includes, in addition to the director, a full time field veterinarian, Dr. Theodore R. Ridgeway; field biologist, Charles M. Marshall; biological aide, James F. Smith; medical technician, Gloria J. Dills; and business manager, Lounette Whelchel. George R. McCahan and Annie K. Prestwood are also employed as part-time senior veterinary student research assistants.

These specialists are ready to go anywhere in the 11-state region at any time to investigate mysterious wild animal deaths. They have already located a primary killer in the parasites, and they think they know why these killers have gained such a strange strangle hold in some areas.

They say it's overpopulation.

The theory. of course, must have a proof so the study is now conducting a region-wide parasite survey. They are collecting and thoroughly examining ten deer taken at random from potentially critical areas within each participating state. State biologists set up the field laboratories and general facilities. They make the tables, get running water and electrical current, and collect specimens. Water can often be pumped in from a nearby river, but power sometimes has to be supplied from long distances. They also furnish coffee for the study team, for the research work goes on far

Parasites Found In Virginia Deer

Deer hunters in western Virginia this season turned in 65 deer heads to the Cooperative Wildlife Unit at Virginia Polytechnic Institute, Blacksburg, for examination for brain worms. Of the first 44 heads examined, 42 were infected.

Hunters turned over 10 deer carcasses to a wildlife disease study team for examination at its mobile laboratory at Deep Creek in Norfolk County last October 2-5. Examination of seven animals taken on the west side of Lake Drummond in Nansemond County revealed a high incidence of parasites. The lungworm was most prevalent. The brain worm was found, as were numbers of stomach, abdominal, and intestinal worms. Examination of three animals taken on the east side of Lake Drummond in Norfolk County revealed that these animals were in better condition than the deer taken on the west side of the lake.

into the night and sleep is a luxury they can seldom afford.

When deer are brought to these stations they are aged, weighed and examined for external parasites. Then, after the hides have been removed, they are placed on a necropsy table and meticulously dissected. Careful records of gross lesions are made and all suspicious tissues are preserved for later histopathologic examinations. The contents of the entire intestinal tracts are "fixed" and the parasites kept for future identifications. Both femurs are removed and frozen for fat analysis studies.

So far worms have been found in the nasal passages, brains, pharynxes, gullets, lungs, livers, stomachs, small and large intestines and the abdominal cavities. In some localities various species of lice and ticks are also quite common.

Every incidence of deer die-offs last winter occurred in greatly overpopulated herds. Sometimes there were twice as many animals in an area as the range could possibly accommodate. The food supplies got low; sometimes the weather became severe; animals grew weak; and the full fury of parasitism moved in.

The light mortality noted in recent years should be interpreted as a precursor of a major die-off within a few years to come. The time of such a die-off will be governed by several factors: (1) when deer populations within a certain area exceed the range carrying capacity of that area; (2) when adequate numbers of worm and insect parasites enter the picture; (3) when animals become starved. stunted and weakened until their body resistance is at a low ebb; and (4) when environmental conditions such as an extended winter complicate an already difficult situation.

In short, overpopulation among deer results in malnutrition; partial starvation is the forerunner of parasitism; and the worms and their associates then move in and make a major set-back in the number of white-tailed deer available for the hunting public.

The logical solution to the problem of parasitism in whitetailed deer, the Wildlife Disease Study experts say, is the reduction of deer populations to comply with the specific range carrying capacities. This should be done through legal deer harvests. In many overstocked areas, it is becoming imperative that hunters take more animals, and this must include does, before the number of animals ever can be retained at a safe level.

"If this is not accomplished by sportsmen, the parasites and their accomplices will do so without invitation or hesitation," Dr. Hayes says. "A few parasites do not exert harmful effects on either the animal's health or its venison, but when they are present in great numbers, they become the unwanted hunters."

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Mounted handlers, judges and gallery follow the opening brace of dogs running in the National Open Shooting Dog Championship run last December at Guy Lewis' Hawfield estate near Rapidan. The riders are shown about five minutes after the break-away as they pass one of the many ponds on Hawfield.

National Open Shooting Dog Championship

By TRUMAN F. COWLES

Executive Secretary The Professional Handlers' Association of America, Inc. Manchester, Connecticut

AKER'S PALADEL, four-year-old pointer female owned by John Baker of Washington, D. C. and handled by Ed "Beau" Mougin of Onandaga Kennels at Gaithersburg, Maryland, was named Champion at the conclusion of the inaugural running of the National Open Shooting Dog Championship, held December 4-12, 1961, at Hawfield in Orange County, Virginia. In topping the classy field of 57 starters, this stylish performer put down her winning heat in the last brace of the day Wednesday, the 6th, during the first week of running. In this unsurpassed hour and a half, she offered a race that was a model of stylish running, forward patterning, and constant bidability, which, combined with her score of four independent finds, one divided find, two backs, and a determined finish, served to withstand the challenge offered by several other worthy competitors to annex the coveted diadem for herself, the beautiful collection of sterling silver for her proud owner. and the rich purse for her modest, unassuming handler.

This was the world premiere, the debut, the official bow, of this trial—conceived in calculated meditation, born in the inspired enthusiasm of a dedicated group of ardent field trial men. nurtured by careful planning and attention to every detail, and brought to successful fruition in this initial running, which, encompassing delays for inclement weather, utilized the expenditure of nine days in its competitions,

Answering the need for a blue ribbon trial to be the climax or "World Series" of the present unsurpassed popularity and growth of stakes patronized by the shooting dog type of campaigner, this Championship, in its realization and success, established itself almost overnight as one of the top bird dog events of the nation.

It is most difficult to single out which factor was most important in the makeup which culminated with this auspicious beginning. Certainly the character and foresight of the men who constituted the sponsorship committee was important. Then, too, the grounds at the famed Hawfield Plantation, with all their assets, were no little factor. Who would slight the importance of the selection of the fine pair of judges, who not only realized their respective responsibilities for the decision at this event, but their heavily weighing burden of establishing the clear pattern of what conformed to the ideal of the standard written for this Championship?

The point of origin of this Championship should be of interest to all. Actually it was an outgrowth and development of a creation in the minds of several men prominently identified with the affairs of the Association of Virginia Field Trial Clubs. It is common knowledge that this organ-



Commission Photo by Cutler

Directors: (from left) Verle Farrow, W. S. Richardson, Frank C. Baugh, Harold A. Crane, Parke C. Brinkley, Guy H. Lewis, Jr.



Commission Photo by Cutler

Professional handlers: (from left) Harvey Jordan, Luther Smith, Greg McGarry, Hunter Grove, Ed Mougin, Arthur Bean, Elgin Nininger.

Reprinted from American Field, January 6, 1962.

ization has for the last few years promoted the Eastern Shooting Dog Classic over the grounds at Camp Pickett, Virginia, and this event was originally formulated with the object of eventually obtaining Championship status for itself. However, as the first few trial runs of this event were completed, it was evident to these individuals concerned that, exalted as this particular event has become, it did not fulfill all the hopes and ideals of these dedicated men, and to their distinct credit they searched for something that would be the real answer. At some undefined time in the past, all this thinking and searching was brought to a head when several of these men met and conceived the plan of sponsoring this



Richmond Times-Dispatch Photo by Ailor Handler Oakey Kite puts down Richmond dog Sam the Man for owner George E. Harrison.

elevated form of Championship which came about in this early December inaugural.

It would be most difficult to envision a setting more fitting for an event of this type, planned and destined to be a stake of national stature, than here at the famed "Hawfield," with headquarters in nearby historic Orange, Virginia, Any such trial must have the combination of all the elements which go to make up an ideal set of running grounds, plus the attendant accounterments which make the frosting on the cake. Needless to say they are here, and in abundant quantity.

First, the grounds and running envirous at Hawfield. This area, now under the ownership of Guy Lewis. Jr., noted field trial enthusiast and patron, represents the height of triumph in the combined skills, management and effort to combine the factors in grounds that provide all the necessities for field trials-accessibility, ample running room free of hazards, visibility and practicality-with successful management practices which produce and maintain an abundant native game population, and additionally enough foresight in its management to institute measures to preserve and perpetuate these assets. We do not propose to pose as an expert in game management practices, but it is evident from observation and comparisons with other sites which have been in our itinerary that here the zenith has been reached in successful management of the factors controlling the game population and at the same time combining field trialing. From the day-to-day count of coveys contacted and moved, it is obvious that this area has one of the finest and most constant populations of quail to be found on any field trial site. No less an authority and seer than the veteran Luther Smith, one of the oracles of the game, made the pretrial observation that "he didn't see how they could expect to use each of these courses twice a day and not run off the birds.'

After three days of running, he readily admitted that it

was not only being done successfully, but he understood why and how and pointed out that not in the entire area were there any deep swamps or branches into which the birds could retreat so deeply they wouldn't be contacted, but that "they had to go from thicket to thicket, because there was no place else for them to go." Also it was noted that the owner and his advisers were not resting on their laurels and awaiting the time when the forces of growth and nature would make their inevitable inroads and then make necessary desperate measures to restore conditions. No-it is being done constantly, new areas opened up with "bushhogs." plans laid for new feed patches and other plantings, crossings being improved, drainage being altered, and the other procedures which go into preserving this great site for future improving. Of course, all this is in addition to the accepted fixtures here at Hawfield, where the stables of "the Squire" and his private stock of fine walking and gaited horses are housed, and ample stalls remain for equines brought in by trainers and owners.

The headquarters are traditionally located in the famed President Madison Inn, five miles west in the historic town of Orange. This commodious facility has long been the home-away-from-home for the field trial folk who have visited trials here at this site.

The festivities attendant to and preceding the drawing were the highlight of the social program. The Chamber of Commerce of Orange was official host for a sumptuous cocktail party in evidence of the spirit of hospitality and appreciation of the people of this charming community. After dinner, we retired again to the banquet hall for the drawing. Parke Brinkley presided over this in most efficient and capable manner. He introduced Chamber of Commerce President Peter Auston who officially welcomed one and all, Chester Phelps, Executive Director of the Commission of Game and Inland Fisheries, outlined the mutual satisfaction shared by his department and the sponsoring clubs in the success of field trials here, and touched upon the objectives served by field trials in the overall picture of conservation.

It is fitting to pay proper tribute to the men who worked and labored both previously to and at the trial itself to insure its smooth conduct and successful running. Secretary Verle Farrow is an accomplished operator in any and all of the duties attendant to his post from long association and background in this capacity, and this was another feather in his cap. He was present for nearly the entire running and joined forces with President Parke Brinkley, together accomplishing the job to everyone's complete satisfaction. Franklin Baugh was conspicuously present and participating in every way possible to facilitate the trial. Steve Richardson was on hand nearly all the way and a definite asset in many ways. Dick McAfee, the wide-awake Kasco Dog Food representative in this area, was very much in evidence and a tremendous force in keeping the horse rental situation going smoothly with the well-groomed horses from Dale Bartley's Stables. "The Squire." Guy Lewis, Jr., was on hand at the opening gong and still present when the last of the survivors were leaving on Tuesday of the second week, still beaming with his broad smile and doing his utmost to make everyone feel at home and enjoy the entire occasion. Altogether these men made a great team, and we hope they will all be kept together in the years to come by the common bond of ideals and achievement which marked this, their first National Championship.

MARCH, 1962

The National Parks In Virginia

By ELBERT COX, Regional Director National Park Service Richmond, Virginia

O MANY of the units of the National Park system located in Virginia have to do with history that it is natural to think first about the history of Virginia. This takes us in retrospect to the landing of the colonists at Jamestown in 1607 to establish the first permanent English settlement in what is now Virginia and what was then the New World. More than two and a half centuries would go by before Yellowstone National Park, the first national park, was established in 1872.

The establishment of the Shenandoah National Park in Virginia, which is the only unit in the system in Virginia which falls in the classification of *national park*, first began to be discussed when a committee was appointed by the Secretary of the Interior in 1924. This committee was initially directed to study the possibility of a national park in the southern Appalachians. In the end, a favorable report and recommendation for establishing the Shenandoah National Park resulted. The establishment of the park was authorized in 1926.

Virginia ranks high among all the states in the number of National Park Service areas, having only two less than Arizona's 19.

It would seem reasonable to expect that efforts to preserve places like Jamestown would have occurred first in Virginia. We cannot claim this distinction, I am sorry to say, and as a result much has been lost which we wish now could have been saved. Jamestown, the first capital, fell into ruins and was abandoned soon after the seat of government was moved to Williamsburg in 1699.

It was not until 1893 that a group of patriotic men and women organized and were successful in preserving a small piece of the original town of Jamestown. This small tract, roughly $22\frac{1}{2}$ acres, is still owned by the Association for the Preservation of Virginia Antiquities. The remainder of the island was acquired by the National Park Service in 1934, and the two properties are preserved and managed by agreements between the APVA and the National Park Service.

I speak of preservation of historic sites because that is a very important part in the program of the National Park Service in Virginia. The beginning of an interest in Virginia in historical preservation undoubtedly can be traced back further, but there is no doubt that the plans carried out by Mr. Rockefeller in Williamsburg were a great stimulus to the movement in Virginia and, in fact, throughout the entire country. There is a direct relationship, I am sure, between the Williamsburg Restoration which got underway in the late 1920's and the establishment of historical parks and monuments by the National Park Service. For example, I am thinking of the George Washington Birthplace National Monument created by Act of Congress dated January 23, 1930, and the Act of July 3, 1930, which authorized Colonial National Monument now known as Colonial National Histori-

Adapted by permission from the proceedings of the Seventh Annual Landscape Short Course held February 15-17, 1961, at the Jefferson Hotel, Richmond, Virginia.

cal Park, comprising Jamestown Island, site of the first English permanent settlement in America; Yorktown, scene of the culminating battle of the American Revolution; and the 22-mile parkway, connecting these and other colonial sites with Colonial Williamsburg.

At Jamestown nearly all of the original structures have disappeared. The significant exception is the old church tower which stood in ruins and which, thanks to the active efforts of the APVA, has been preserved.

Accordingly, at Jamestown, we have settled on a plan to excavate and expose the original foundations, mark paths and walks and property line ditches, using simple and unobtrusive signs, markers, and audio labels to explain them.

The methods and techniques which are employed at Jamestown represent the general approach which the National Park Service expects to take in development plans for the Civil War parks in Virginia. The Civil War parks provide a pretty complete frame work on which to hang the story of the Civil War in Virginia from Manassas to Appomattox, The Civil War parks in Virginia pretty well portray the progress of the war in the eastern theatre. First, Manassas; then the several battles around Richmond; Fredericksburg and related battles there—Chancellorsville, Wilderness, and Spotsylvania Court House; Petersburg; and finally surrender at Appomattox Court House.

More and better service for visitors is one of the prime objectives of current National Park Service planning. On the Blue Ridge Parkway (right), park rangers conduct informative field trips.



Park Service Photo

The discussion of the national parks in Virginia would not be complete if I were to omit reference to the Blue Ridge Parkway. The first truly rural scenic parkway project of such magnitude in the entire country, the Blue Ridge Parkway has pioneered this new form of recreational development in the National Park System. A national parkway is essentially an elongated park in which campgrounds, picnic areas, and other visitor services are planned and developed at locations selected to fit the topography and requirements of visitor use. One of the first projects in the parkway category was the Colonial Parkway which extends 22 miles from Jamestown to Yorktown through Williamsburg. Other projects, in and around Washington, the nation's capital, when completed will extend on both sides of the Potomac River from the Great Falls to Mount Vernon.

Completion of the parkway for its entire length from Shenandoah National Park to Great Smoky Mountains National Park is scheduled under Mission 66 with the exception of those sections around Roanoke and Asheville. It looks now as if they will have to come later, after 1966.

VIRGINIA WILDLIFE

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CONSERVATIONGRAM

Commission Activities and Late Wildlife News . . . At A Glance

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CLOSED SEASONS REMOVED ON ALL FISH EXCEPT TROUT. The Virginia Game Commission, on January 5, passed a regulation which removed closed seasons on all species of fish except trout. The regulation change, which was effective February 15, will have no real effect on fishing until April 30 when, in the past, the season on bass and walleye was closed for 51 days in counties west of the Blue Ridge.

The trout season was set to open at noon on the first Saturday in April, which this year falls on April 7, and continue through December 31. One group of western counties will be closed for stocking May 7 through 11, and another group will have a similar five-day closure May 14 through 18. Privately stocked waters will not be included in the closures. The daily creel limit on trout is eight.

Ice fishing on Virginia's inland waters became legal on February 15. other regulations are the same as for other fishing methods.

DEER AND TURKEY KILL DROP SLIGHTLY, LITTLE CHANGE IN BEAR KILL. The 1961-62 Virginia deer kill totalled 32,882 animals, according to the final count of big game tags by the Game Commission. While this reflects a drop of over 3,000 animals from last year's record total of 36,165, it is Virginia's second highest deer kill on record. The western kill was down over 2,000 from last year's total and the eastern kill was down about 1,000 when all tags were tallied. Caroline County again led the state with a total of 1,966. Augusta County was the biggest producer in the west with a take of 1,921 deer.

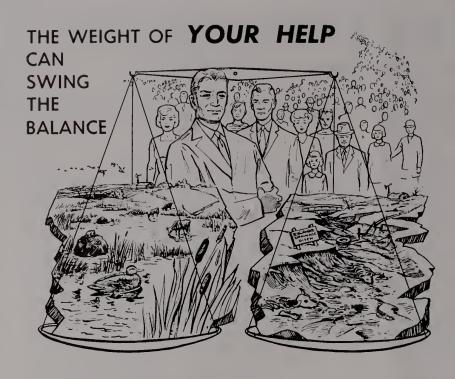
Virginia's 1961-62 turkey kill totalled nearly 3,700 birds, down about 900 birds from last year's record kill of 4,597, according to Commission records. Biologists consider the slight decrease a normal fluctuation and are not recommending any restriction of next fall's turkey season. Bath County ranked highest in turkey kill with 306, followed by Rockbridge with 245 and Augusta with 240.

Bear hunters in Virginia held their own, with 201 tags received by the Game Commission so far, about equal to last year's total of 209. Archers accounted for five of the bruins this year, the first time bears have been legal game during the 15-day archery season. Archers also made their mark on the whitetails, with a take of 318 deer, an increase over last year's archery kill of 226.

SPRING GOBBLER SEASON SET FOR APRIL 23-28. A spring turkey gobbler season will be held on certain Commission-owned management areas, military areas and in the counties of Amelia, Chesterfield, Nottoway and Powhatan. Only bearded turkeys will be legal targets during the season which will be open April 23-28. Shooting hours will be one hour before sunrise until 10:00 a.m. The Commission-owned Gathright, Goshen, and Little North Mountain areas will be open as well as military reservations Camp A. P. Hill and Camp Pickett. The use of dogs or organized drives is prohibited. The bag limit remains one bird per day, two per season for those hunters having unused 1961-62 turkey tags.

INTRODUCED PHEASANTS THRIVING IN SPITE OF COLD WEATHER. The exotic pheasants which have been released in various parts of the state by the Virginia Game Commission appear to be making it through the rough winter in fine shape, according to Herman J. Tuttle, District Game Biologist. The birds, which include eastern and western Iranian blackneck pheasants, ringneck-blackneck hybrids, and green pheasants seem to be taking hold in many areas where releases have been made. This spring will be the fourth breeding season for some of the birds on the early release sites.

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BY CONSERVATION OF WETLANDS WHICH BENEFIT MAN AND WILDLIFE



Roberts Kit Craft Photo

Commission Photo by Kesteloo

Destruction of habitat and increased hunting pressure are dealing a one-two punch to our duck supply. Only through the setting aside of millions of acres of wetlands can we assure ourselves of future waterfowling. The erection of nesting boxes (as at left) aids wood ducks in Virginia.



The sight of waterfowl, the heritage of a continent, never fails t past, w

Theme of National Wildlife Week Ma

WEI

The struggle to save North American waterfowl will ant conservation issues of this decade. Hard hit by drabers have been going downhill for several years. Cens year ducks dropped an additional seven percent in the Mississippi Flyway. Even geese, which were thought the conditions in the prairie region because of their far nel three-fourths as numerous as they were the previous with

It is evident that a crash program is needed if we a have already been taken in this direction. Congress goice a loan of \$105 million dollars to purchase wetlands. It seven million acres needed to assure the future of our we state and local levels will be necessary if we are to find

What you can do:

• Support the wetlands acquisition program at fede



Commission Photo by

Hunters, through license fees and purchases of duck stamps, providing of the financing for the waterfowl wetlands acquisition programs swildlife agencies use license fees to acquire waterfowl area as the Hog Island State Waterfowl Refuge in Virginia (above.)



Commission Photo by Kesteloo

the beholder. There is something about the unerring migrations of ducks and geese and other water birds, an instinct for survival developed in the distant appresses man as no other single mystery of nature. Above, a flight of mallards in Virginia's Back Bay.

18-24 - -

NDS ARE ESSENTIAL TO MAN AND WILDLIFE

coupled with drainage, duck numcoupled with drainage, duck numcures in January showed that this ntic Flyway and 14 percent in the rather invulnerable to the drought n breeding range, were only about

bing to save our waterfowl. Steps I the U. S. Fish and Wildlife Servwill purchase less than half of the wl. More support and assistance on e job we have started.

atc and local levels. Recently en-

acted federal laws require federal authorities to obtain the concurrence of state officials before acquisition of wetlands by lease or purchase can begin in a particular State. Landowners also must be persuaded to cooperate.

- Support appropriate proposals for the establishment of state refuges and wildlife management areas.
- Waterfowl enhancement features, when suitable, must be included with plans for Federal water development projects in accordance with provisions of the Fish and Wildlife Coordination Act.
- Urge that waterfowl gunners observe federal and state hunting regulations; shoot only drakes (males) when possible; and retrieve all crippled birds.
- Report known violations of waterfowl protective laws and regulations to federal or state law enforcement authorities.
 - Buy Duck Stamps each year even if you do not hunt.



Commission Photo by Harrison

There can be no life without water. Despite this well understood fact, the plundering and dissipation of wetland areas continues with direct or indirect detrimental effects upon water resources. Because they are generally considered worthless from the economic point of view, wetlands are being drained without consideration for their values as water retention basins to curb flooding conditions. Furbearers and other forms of wildlife are just as dependent upon wetlands as are waterfowl such as the Canada geese shown above.

MARCH, 1962



Commission Photo by Kesteloo

The National Wildlife Federation was organized in 1936 to try to keep America from some day finding itself "adrift in a bone yard" without any resources left.

By MAJ. J. L. MURPHY USMCR (Ret.)

Director, Region 3, National Wildlife Federation

Kill Devil Hills, North Carolina

ADRIFT in a boneyard is not a situation that one would choose for recreation or relaxation, nor as an area to furnish natural resources. However, it is where we are likely to find ourselves as a nation unless the value of our remaining renewable natural resources is understood by every citizen of this country.

Maintenance of our increasingly healthy environment and high standard of living is entirely dependent on this understanding and on the practices involved in natural resource conservation.

Pages and pages of history are filled with stories of communities of men now only memories. Peoples vanished from earth because of their failure to understand and to practice simple conservation principles.

Twenty-five years ago a group of men and women met to determine ways and means to meet the manifold problems presented by this situation. It was recognized as an age-old problem. Maintenance of productivity was a little understood factor. Population increase and industrial expansion was plaguing men, as in the past it had harassed large areas of the world, in a struggle to get a living from the earth just to keep ahead of the menace of starvation and to have available, when needed, adequate raw materials. Technological advance can supplement but never supplant nature's gifts.

Organization of the National Wildlife Federation in 1936 was the result of this meeting. It is chartered as a non-profit educational federation comprised of conservation affiliates in each of the 50 States and the District of Columbia. Representatives of these state organizations, in annual meeting, decide the policies of the Federation. A Board of Directors consisting of the officers and one member from each of the 13 ecological areas of the country has the responsibility of accomplishing adopted policy through employed staff. The officers and directors serve without compensation.

The Federation is dedicated to the proposition that the place to begin a resource education program is at the "grassroots." The first lesson to be taught is that no single natural resource stands alone—soil, water, forests, wildlife,

grasslands, wilderness, parks and people all are inter-dependent. This is a phase of conservation much misunderstood. The Federation program moves to teach this relationship to both old and young.

Failure to appreciate or a deliberate attempt to by-pass the inter-dependency of renewable natural resources is often due to pressures applied by organized groups with an eye to immediate gain: self-serving private interests, a Federal or State agency, farmers who disregard sound agricultural practices and thus create dust bowls and silted streams, and dam-constructing agencies with callous disregard for forests, fields and game and fisheries resources in planning areas of impoundment. Industry and local governments are no less culpable when discharging municipal wastes and industrial contaminants in the streams of the nation. The list could be extended but the above will serve to illustrate the necessity for the educational program of the Federation if destructive practices are to be halted and productivity maintained. The Federation is not the only association of citizens concerned with resource use but it is the largest, with over two million members on the rolls of its affiliates.

"PUT and TAKE"—plant and harvest and renew; rest a while and plant again, for these God-given bounties of nature are not inexhaustible. They must be wisely used and managed on a cooperative basis. Remember, they are all interdependent. If these principles are practiced, there will be ample to meet the needs of our complex civilization and to serve future generations both with the variety of usable resources and as an example of our appreciation of and responsibility for present use and future needs.

The Federation receives no money from any of its affiliates as such. It is supported by voluntary contributions in return for Wildlife Stamps and from other donors. It might be of interest to know how its funds are expended. The Federation has published and distributed over 50 different educational booklets and the Conservation News, a semi-monthly pamphlet dealing with some phase of resource use abuse or threat. Scholarships are awarded annually to selected individuals who wish to make a career in conservation work. A field staff covers the country studying proposed projects and legislation, reporting their findings to the Washington office where further study is given and interested agencies advised. The field men also work with the affiliates in planning local programs. Once each year, usually the first week of spring, the President of the United States announces Wildlife Week, sponsored by the National Wildlife Federation in cooperation with its affiliates and enjoying the support of all communication agencies, magazines, newspapers, radio, TV and a speakers' bureau. The support of this program extends to Governors and municipal authorities and, with all of these groups cooperating, reaches the objective of the "grass roots." Staff salaries and other expenses of a business organization are paid from Federation funds.

That the Federation is moving in the right direction is attested to by the respect and confidence given it by public officials, sportsmen and private citizens over the land. Its program begins in the home—urban, suburban or rural—for home is the "grass roots" where all education begins. Conservation begins with flowers and shrubs and grass plots; the feeding and protecting of birds and animals; it may be pursued in the shade of woodlands, in a quiet place beside a whispering brook. Yes, conservation begins at home, and if practiced consistently and continuously will dispel the disaster of being adrift in a boneyard.

Wildlife Conservation Unit 1 Fish and Fishing Study 3 - -

Fish Habitat

By DOROTHY E. ALLEN Education Officer

UR objectives are:

- 1. To understand why fish require different habitats.
- 2. To have the experience of making a trip to a fish's habitat and learning how to collect specimens.
- 3. To learn of the existence of the "food chain" which is necessary to all life.
- 4. To know the enemies of fish.
- 5. To know what diseases fish have.

The following equipment will be helpful:

- 1. A map of Virginia.
- 2. VIRGINIA WILDLIFE "Food Chain" reprint G-2 or other food chain illustration.
- 3. Equipment for collecting specimens (See Suggested Activities).

A new word for you to learn is LIMNOLOGY. Limnology is the basic study of all bodies of water and is the foundation for modern-day fish management practices. Lakes and streams differ in size, shape and depth, and in addition to these physical differences. their waters have chemical differences. Because of these differences we find certain types of fish, other animal life, and plants in certain types of lakes. If you want to catch a trout you go to a mountain stream, whereas if it's a fighting bass you hope to hook, you visit a different type of fish habitat. Study the following types of lakes and streams to learn "what fish lives where."

Trout Waters

A trout stream usually has a fall of 10 feet or more per mile and a rocky bottom with pools and riffles. It is usually shaded, which helps to keep the water cool during the hot summer months. The stream is spring fed. clear and lacks fertility. Virginia has some 1.500 miles of trout water, largely in the forested mountain lands west of the Blue Ridge. Take a map of Virginia and see if you can find the following trout streams: Whitetop Laurel in Washington County. Big Stony in Giles, Potts Creek in Alleghany. Piney in Amherst, Tye in Nelson, Jennings Creek in Botetourt, Rapidan in Madison County, and Dan River in Patrick. Smith River in Henry County. Many others are popular, but these streams, generally speaking, rate high.

Attention, Teachers

ONCE basic fish habitat requirements are studied and the food chain and "pyramid of numbers" are understood, a trip to a nearby stream or pond is more interesting than any study using words alone. An excellent way to study an animal is to watch it. Much that we know about animals has been learned in this way. A trip to see live sunfish in their natural habitat is a wise choice in a fish study. We urge you to try to arrange a trip to observe fish and bring back some of the things found in its habitat for a better understanding of the points made in this study. See Suggested Activity No. 3, Trip to a Pond.

Smallmouth Bass Waters

The water is usually clear but will become slightly murky after heavy rains and is of medium fertility. The water temperature falls below the air temperature by about 10 degrees Fahrenheit. This type of stream may have large pools interspersed with rapids. Smallmouths are found in all of the larger rivers in the piedmont and mountain sections. Our best smallmouth waters are the James. Shenandoah (both forks), Holston. Rappahannock, Jackson. Cowpasture and Maury rivers and Back Creek. Find these on your map.

Largemouth Bass Waters

Largemouth bass lakes are usually quite fertile and contain much organic matter. In Virginia, largemouth bass are found in streams statewide but are more prevalent in the piedmont and coastal plain. They prefer larger, more slowly flowing streams than do smallmouth bass. They are also found throughout the state in small farm ponds.

Water Temperature and Dissolved Oxygen

To say that fish live in water is as broad a statement as saying that most mammals live on land. Actually, fish are very particular about where they live. Each species is found only where it can satisfy its needs with respect to the temperature of the water and the content of the water.

Temperature affects respiration because the temperature determines the ability of the water to hold dissolved oxygen. While all fish breathe the oxygen dissolved in the water

The "pyramid of numbers" concept is illustrated below. In any wild natural community, the organisms which serve as food are present in much greater numbers than the organisms which eat them. For example, in a well balanced pond there are 10 bluegills to every bass present.



which surrounds them, their individual requirements differ. Some fish which have gills of relatively low efficiency when it comes to absorbing oxygen (such as trout) must have around them a considerable amount of dissolved oxygen. Carp are satisfied with a smaller proportion of dissolved oxygen in the water. Bodies of water differ considerably in their content of dissolved oxygen, and oxygen content varies considerably from place to place and from season to season in the same body of water.

The colder the water, the greater its power to dissolve oxygen. Warm water is definitely lacking in oxygen, Carp flourish in it; trout die in it. In cold water—swift flowing, rich in dissolved oxygen—trout get on very well and the carp not at all.

Trout can't live in the rivers of the piedmont, where the water is warm in summer and flows slowly. Similarly, small-mouth bass make no attempt to reach the mountain torrents even if they get the chance.

All fish native to this latitude tolerate water to the freezing point. However, trout prefer temperatures from 50° to 65° F., and warm water fish prefer temperatures from 70° to 85°. No species "thrives" in water below 50°.

Fish are extremely sensitive to low temperatures, and even trout fail to feed at temperatures lower than 40 degrees. Even if they absorbed nourishment, they would not be able to digest it, for the digestive juices would not be able to function. When temperature is still lower, fish seek shelter or go to the bottom in a condition of semi-hibernation. Its life is suspended. It will return "to life" later when the waters are warmer,

Temperature plays such an important part in fish distribution that in Virginia we can classify fish according to the following categories:

Cold Water Fish—Brook Trout, Rainbow Trout, Brown Trout

Cool Water Fish—Smallmouth Bass, Spotted Bass, Rock Bass, Redbreast Sunfish, Walleye

Warm Water Fish—Largemouth Bass, Chain Pickerel, Bluegill, Black Crappie, White Crappie

Food

Water alone is not sufficient to support fish life. There has to be enough food available for fish to live. Fish never stop growing throughout their lives if there is enough food available. This food supply depends upon basic nutrients (organic matter and minerals) that are in the soil and enter the water through runoff from the surrounding land during rains. Along with sunlight and air, a suitable living place for microscopic plants is produced. These plants, in turn, supply food for microscopic animals. These organisms (plant and animal, called plankton) soon multiply into extremely large numbers and provide food for larger animals. Aquatic insects lay their eggs in the water and their young hatch into larvae which may live months to several years before emerging as an adult. These larvae live on plankton and, of course, the larger insect larvae live on the smaller ones. In turn, these insect larvae provide food for crayfish, minnows, and small fish. The small fish are food for the larger fish, until the last link in the food chain—and the top of the pyramid of numbers—is reached with the largest type of predator fish. These predator fish make food for mammals, fish eating birds and man. The large predator fish that are not killed die, returning organic matter to the water through the processes of decomposition, and the food cycle is started

all over again. (Look at pages 11 and 15 in Virginia Willd-Life. March. 1960, or write to the Game Commission for Reprint G-2. "The Stream's Food Chain." in full color.) Life in any body of water is a complex inter-relationship of plants and animals. Without the plants and minute animals there can be no fish life.

Growth

Unlike birds and mammals, fish never stop growing. This is true of most cold blooded animals. (Warm-blooded animals usually reach what is known as a normal size for that animal.) You may speak of a full-grown man, a full-grown dog, a full-grown canary but there is no such thing as a full-grown rattlesnake or a full-grown trout. Fish, or most of them, will continue to grow if they receive the proper amount of food. The rate of growth varies in different species. In general young fish grow much faster than older fish. Habitat conditions influence the growth of fish,

Fish Enemies

Fish have a host of enemies which prey on them in different ways and at different times. Ducks, grebes, loons, herons, water ouzels, and kingfishers take fingerlings and small fish, while ospreys, otters, minks, and raccoons take larger fish. Man's changing of the environment has taken its toll of fish.

Fish Diseases

Like all animals, fish have their share of diseases, parasites and abnormalities. Look up in the dictionary the definition of a parasite. Usually the ailment of fish may be placed in one of the following four categories:

- 1. Disorders resulting from harmful *external* physical and chemical factors such as high or low water temperatures, insufficient dissolved oxygen, mechanical injury and pollution;
- 2. Dietary deficiencies resulting in stunting, anemia, gill diseases, cataracts of the eyes, and malformations;
 - 3. Tumors:
 - 4. Diseases caused by infectious agents and parasites.

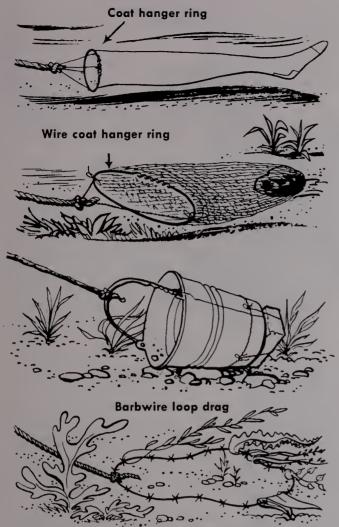
Sudden large mortalities involving several fish species (massive "fish kills") are often a sign of man-made pollution.

Suggested Activities

Take four large bottles (preferably two-gallon) and label them one through four. Place about two inches of sand in the bottom of each bottle. Plant the same number of water plants in each bottle. These may be collected from a pond or purchased at a store which sells goldfish and aquarium supplies. Place two small fish in each bottle. In number one bottle place one snail; in number two. drop a half slice of bread: in number three. 2 c.c. of toxic chemical such as tannic acid: in number four, place a half a pound of colloidal clay. Seal each bottle (cork or lid and masking tape will work). Place bottles on a window or where they will receive sunlight. Do not disturb any of the bottles but the one containing colloidal clay. This bottle should be shaken slightly several times a day in order to keep the clay suspended. Observe the change that takes place in the color of the water in bottle number two What caused the color to change? How were the fish affected? How does bottle number one differ from two, three and four in appearance of the plants and animals? Analyze the relation of the living requirements of both plants and animals with respect to what happened in cach of the four experiments.

TRIP TO A POND. (A must activity, if at all possible.)

If plans are carefully laid, a trip to observe a colony of sunfish at spawning time has the possibility of being unusually successful. The fish are in shallow water and are



Reprinted with permission from Conservation, Campfire Girls, Inc.

Methods of collecting samples of materials present on stream and lake bottoms are shown above.

casy to see. They refuse to go far from their nests or to stay away long except under great stress. Thus, one can depend on them to be there when watchers arrive. While it is often difficult to observe the activities of land animals with a large group, the sunfish will probably be undisturbed if a few precautions are taken. It should not be difficult to find sunfish in most neighborhoods. They live in quiet bodies of water where there is sufficient food, little pollution, and shallow water with a fairly hard bottom for nesting. The nests are not hard to find. They stand out clearly as clean-looking round spots on the bottom. (They spawn heavily in May, with lighter spawning activity throughout the summer.)

Plans for the trip:

1. Learn where sunfish are from boys or from local sportsmen, make certain that the sunfish are nesting at the time, and go to the place with your class.

2. Choose a time for the trip, if possible, when the sun is high in the sky to avoid the difficulty of surface reflection.

3. Choose places on the shore where the fish may be easily observed.

4. Divide the class into groups to observe and report on activities at different points.

5. At the pond, approach the fish slowly, a small group at a time. Avoid sudden movements, Ordinary talking will not disturb the fish but a suddenly pointed finger may. Stand quietly and watch, the fish will do the rest.

After you have watched the fish for sometime, turn over some of the rocks on the bottom to see if there are any aquatic organisms clinging to them. Get a handful or two of the bottom material and sort through it to see if there are other organisms living there. See diagrams for methods of collecting materials,

To find the depth of the water in various places, take a clothesline knotted at 5-foot intervals with a weight on the end. From a boat or various spots along the shore drop the line and determine the number of feet by counting the number of knots that are passed before the weight hits bottom.

Wash the bottom material in a sieve or strainer. Dump it into a white pan or tray and look for insects.

Drag in some of the plants from shallow water and wash the material in the bag through a sieve onto a rag to examine it.

Drag a stocking plankton net in water. You may find little organisms known collectively as plankton. Some of these are big enough to see if you wash them into a jar of clear water and hold it up to the light. Some of these organisms make their own food and are in turn eaten by some of the insects you have found. Bigger insects may eat little ones. Frogs and fish eat insects, and you eat fish.

Try to catch a fish. If you do, cut open the stomach and see what it has been eating.

As a follow-up to this pond or stream trip, the students may write a report on what they observed or make a display of specimens they collected. They could tell in reports of how the lake is affected by the land around it—trees or hills that would shade the water and protect it from winds, plants present that would decrease the amount of soil coming into the lake, etc.

Take the temperature of the water at different places and at different depths.

Draw a lake or stream pyramid of numbers or food chain depicting its inhabitants.

Some Reference Materials

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Gwathmey, John H. "The Chickahominy," VIRGINIA WILD-LIFE, XI (October, 1950), Reprint.

Gwathmey, John H. "The Mattaponi," VIRGINIA WILDLIFE. XII (February, 1951), Reprint,

Harris, Malcolm H. "The York River." VIRGINIA WILDLIFE, XII (April. 1951). Reprint.

Henderson, Croswell, "The Shenandoah," VIRGINIA WILD-LIFE, XI (December, 1950), Reprint,

Martin, Robert G. "Brown Trout," VIRGINIA WILDLIFE, XXII (March, 1961), Reprint A-4.

Martin, Robert G., "Food Chains," VIRGINIA WILDLIFE, XXI (March, 1960), Reprint G-2.

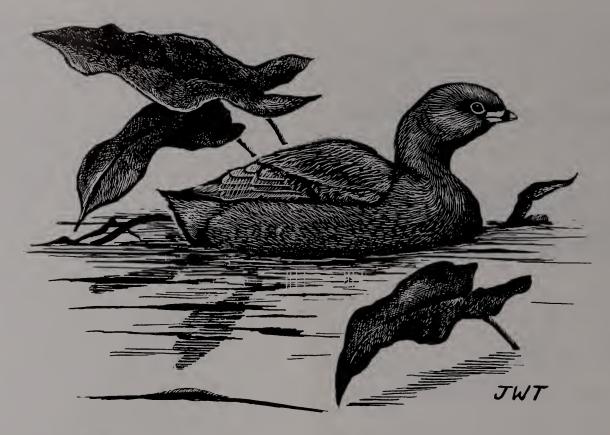
Roseberry, Dean. "The New River." VIRGINIA WILDLIFE, XII (March, 1950). Reprint.

Walker, Ross H. "The James." VIRGINIA WILDLIFE, XII (January, 1951), Reprint.

Wollitz, Robert E. "A Study of the Largemouth Bass in Back Bay," VIRGINIA WILDLIFE, XXII (January, 1961). Reprint H-2.

These 16-mm motion pictures are available from the game commission: Chain of Life (sound, color, 11 minutes). Pond Life (sound, black and white, 10 minutes).

NEXT MONTH: Study 4—Fish Management.



Bird of the Month:

The Pied-billed Grebe

By DR. J. J. MURRAY Lexington, Virginia

NE of our most interesting and remarkable water birds is the little pied-billed grebe. It is an animated torpedo, almost as well suited for life under water as for swimming on the surface. It can dive for long periods, coming up far from the place where it submerged. Sometimes after a dive it will hide in a bit of grass or weeds in the water, simply sticking its bill out far enough for breathing.

This grebe has the strange ability to change its specific gravity so as to submerge without making any motion to dive. In the old black powder days it is said to have been able to dive fast enough to escape a gunshot. Whether that be true or whether its success in avoiding danger was due to small size and quick action, it is helpless against modern ammunition. But certainly no one except the wilfully cruel would take a shot at this harmless and attractive bird.

Every Virginia farm boy knows this common but elusive little creature, if not by its formal name, at least by one of the popular names like "di-dapper" or "hell diver." It is common on all Virginia streams and millponds in the fall and spring migrations, and in winter in eastern Virginia. Its summer status in the State is more uncertain. Although we have few positive breeding records, it probably nests in Virginia more often than we realize.

A number of nests with eggs have been found in the Chincoteague Refuge in recent years. Young birds, recently hatched, have been found in Warwick and Norfolk counties.

Adult birds have been seen in summer across the State. I once found an old nest near Lexington that seemed to be a grebe's nest, and have heard the weird "cow-cow-cow-cow" calls that may have indicated the beginning of courtship.

The nest is a mass of vegetable material, anchored to rushes or reed stems in shallow water. As soon as the young are hatched the tiny, fluffy balls take to the water and swim easily after the mother bird. At times they rest by riding on her back, half-buried in her feathers.

The term "pied" in this bird's name is an old English word that means "party-colored." It refers in this case to the black ring around the grebe's bill. This is the smallest of our eastern grebes, measuring about 12 inches from the thick chicken-like bill to the end of the stubby tail. The bird is dull brown in color, darker on the back, with a black throat patch.

Under the outer feathers is a mass of down, so felted and so well oiled that the bird can never be wet through. The oddest feature of the bird's build, common to all its larger relatives among the grebes and loons, is the location of the short legs. They are placed far back, almost under the tail, in a position that causes great awkwardness in any movement of land but that makes for the utmost efficiency in underwater swimming.

The little pied-billed grebe does no damage to any of man's interests, is not edible, and adds much interest to our waters. It should never be shot.



Edited by DOROTHY ALLEN

Local Chapter Of I.W.L.A. Promotes Wildlife Food Plots

Each spring the Federicksburg-Rappahannock-Chapter of the Izaak Walton League sponsors a wildlife food patch contest in the three nearby counties of Spotsylvania, Stafford, and Caroline. The following fall brings the food patch judging and the anxious hope of the 4-H and FFA boys who have worked hard to raise a fruitful plot of wildlife food to improve game populations.

The Chapter furnishes the seed (provided by Game Commission) to be used and a set of rules to guide the contestants. In addition to judging the yield and to see if the eight different varieties of plants in the seed mixture have successfully produced food for wildlife cach contestant must write an essay telling the value of his food plot. A first prize of \$25, second prize of \$15 and a third prize of \$10 is awarded to the winners in each high school either during an assembly program at the school or at the Chapter's club house. Judging is done by a Game Commission biologist, State game warden and county agent or a member



Gray Squirrel

of the Chapter's committee on conservation. The 1961 winners were as follows:

Spotsylvania High School—1st, Harris Gardner, 2nd, Carlton Sims, and 3rd, Raymond Sims. Caroline High School—1st, Mike Wegeath, 2nd, Milton Cecil, and 3rd, Kenneth Carter. C. T. Smith High School—1st, Lee Young, 2nd, Roger Galyen, and 3rd, Dabney Allen. Stafford High School—1st, (shared by two brothers) Charles and Raymond Tolson, 2nd, Robert Randall, 3rd, John Embrey.



Ruth K. Stroh Photos
For a class project on animal tracks, mix flour
with up to one-half as much salt and a little
powdered alum. Mix with water until doughy
consistency is achieved. Mold by pushing animal
track patterns in the dough which hardens.



Or pour dry flour in a tray and make "tracks" lightly with hands, just as animals step on quiet snow. Use library science and animal books as references. Locate real animal tracks to copy.

Animal Tracks

School children can learn about animal tracks in two new, artful ways. They may paint animal tracks on hardened laundry starch, which simulates snow. Or they may make the "tracks" in dry flour. After using books, and real observations, these techniques aid learning and retention. They also sharpen children's observations of nature. "Animal tracks in winter" is a fascinating study, in any grade. (Pet tracks are also fun to do.)

Use cold mix type starch, with only half as much water as the package calls for, until the starch may be poured. The lump starch hardens quickly. In a half hour, painting can be done, and lasts indefinitely. A baking tray is used for the starch.



Winner of the River's Bend Sportsmen's Club of Radford's first wildlife food patch contest was Bishop M. Gordon of Elliston, who used a quail planting mixture sold by T. W. Wood & Sons Seed Co. of Richmond.



Lyle Garth (right) and his father, Harry L. Garth, admire the lush growth which won Lyle first place in the food patch contest sponsored by the Charlottesville-Albemarle IWLA Chapter.



Photo from Mrs. Herbert Silvette
The original water colors of Virginia's wild
flowers by John W. Taylor from which the fourcolor engravings were made for the center
spread of the June 1961 issue of VIRGINIA
WILDLIFE were displayed at the Monroe Elementary School in Greene County recently, together with the rules for entering the Virginia
Wildlife Essay Contest.



John Doran, Hayfield



Drew Daniels, Orange



The Times Herald Krieg Pursifull, Newport News



Glenn Dotson, Fishersville



The Daily Progress

Dewey and Gene Garrison and Jesse Seale, Jr., Crozet

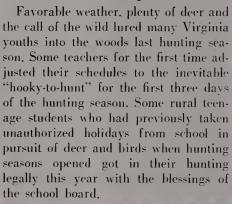


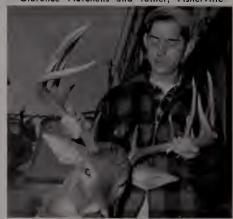
The Staunton Leader Clarence Hutchens and father, Fisherville



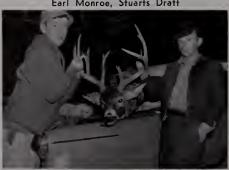
News-Virginian
Earl Monroe, Stuarts Draft

Successful Young Hunters





Robert Driver, Churchville



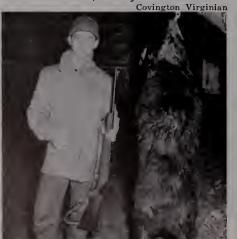
The Staunton Leader Above—Roger Howdyshell, Churchville, and James Corbett, Staunton; below—Steve Patrick, Jr., Covington



Above—Jack Clement, Halifax; below—John Maupin, VPI student Covington-Virginian



below---Ronnie Fleenor, Bristol; Above—Carl





Grayson, Bristol





Edited by HARRY GILLAM

Spring Burning Limited To Evening Hours

Do not burn trash or brush until after 4 p.m. from March 1 through May 15. The law prohibits setting fires within 300 feet of any wood lot or brushland except between the hours of 4 p.m. and midnight in all counties with organized fire protection during this period. The regulations apply to warming fires, campfires, and trash or brush fires.

It is always unlawful to leave a fire in the open air without extinguishing it. The law makes the last person to leave such a fire responsible for extinguishing it whether he started it or not. For more detailed information on Virginia's fire laws, ask for a copy of "You and the Outdoor Fire Laws" available from the Virginia Division of Forestry, P. O. Box 3347, University Station, Charlottesville, or from other Division of Forestry offices.

Hosner Heads V.P.I. Forestry-Wildlife Department

Dr. John F. Hosner is the new Head of the Department of Forestry and Wildlife at V. P. I. He was born February 5, 1925, at Gillespie, Ill. He graduated from the Gillespie Community High School in 1942, from Michigan State College in 1948 with a Bachelor of Science degree in forestry, from Duke University in 1950 with an M. F. degree in forest soils, and from the State University of New York in 1957 with a Ph.D. in ecology and silviculture.

Upon graduation from Michigan State he served for a year as district forester with the Illinois Division of Forestry, was research assistant at Duke in 1949-50, followed that with another year as district forester in Illinois, then served from 1951-58 as instructor and assistant professor at the Southern Illinois University at Carbondale. In 1958-59, he was the visiting professor of silviculture at the State University of New York, after which he returned to Southern Illinois University as associate professor of silviculture from 1959 until he accepted his present position.



Dr. John F. Hosner

During the war years of 1944-45, John Hosner served as Flight Officer (Navigator-Bombardier) in the U. S. Air Corps in the European Theatre of operations. Married in 1951 to the former Irene Neal of Ewing. Illinois, the Hosner's have two children—Angela Lynn, age 8; and David Allen, age 6.

Dr. Hosner is an ardent hunter and fisherman. He keeps a Brittany which will be introduced to Virginia quail and grouse.

Recreation Or Trees—Which Is The Biggest Product Of Our National Forests?

Figures just released by the U. S. Forest Service offer some food for thought regarding just what is the most important product of our national forests in Virginia. The income from timber sales on the George Washington National Forest for the fiscal year 1961 was reported as \$150,055, while sportsmen were estimated to have spent \$3,366,563 for hunting and fishing on adjoining Jefferson National Forest during 1960.

Fortunately, Virginians are not forced to choose between the uses of their forest lands because the national forests are managed on a multiple-use basis. The U. S. Forest Service is keenly aware of the recreation potential of these lands and is working cooperatively with the Virginia Game Commission to employ the most up-to-date wildlife and fishery management practices.

50 Million Americans Fished Or Hunted In 1960

Fifty million Americans fished or hunted in 1960, 30 million of them in more than an occasional way, and this latter group of sportsmen and sportswomen spent \$3.852,000,000 in 1960 in the process of enjoying this kind of recreation. The 30 million figure was produced by the 1960 National Survey of Fishing and Hunting, returns from which were released by Daniel H. Janzen, Director of the Bureau of Sport Fisheries and Wildlife of the Fish and Wildlife Service.

The number of anglers and hunters has increased at a faster rate over the past five years than the population of our country, according to the 1960 fishing and hunting survey report. The total population increased 11 percent in the five-year period while the number of fishermen and hunters increased 22 and 24 percent respectively. The number of women who hunt increased by 106 percent, while the number of lady anglers was 21 percent higher than in 1955. The 38 percent increase in saltwater fishermen accounted for a considerable part of the overall increase in fishing.

The survey report shows that 30,435,000 Americans 12 years or older spent all or part of 658 million days fishing and hunting. They traveled 26.4 billion passenger miles by car in pursuit of fish and game.

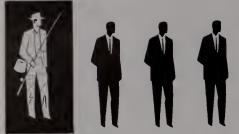
The total expenditures of nearly \$4 billion in 1960 for fishing and hunting compared with \$2,851,000.000 in 1955. The 1960 expenditures are distributed as follows on a percentage basis: licenses, 3; food and lodging, 10; transportation expenses, 14; fishing and hunting equipment, 17; auxiliary equipment, 32, and privilege fees and other expenses, 24.

In 1960 there were 25,323,000 sport fishermen and 14,637,000 hunters. These figures include 9,525,000 persons who both fished and hunted.

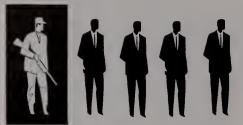
The anglers dropped their lines into the water on 412 million fishing trips totaling 466 million recreation-days; they traveled more than 18 billion automobile-passenger-miles and spent \$2.7 billion. The hunters made 178 million trips, piled up 193 million recreation-days on hunting, traveled 7.6 billion automobile-passenger-miles and spent in excess of \$1 billion.

Salt water beckoned over six million anglers who spent more than \$600 million. This is an increase of 1.7 million anglers and an increase of \$137 million in expenditures compared with 1955.

There were 6.3 million persons who hunted big game in 1960 and 12 million who hunted small game. On the average, small-game hunt-



14,750,000 MEN FISHED One in every four



11,169,000 MEN HUNTED One in every five

ers spent \$60 per hunter, while big-game hunters spent \$55.

The survey shows a total of 1,955,000 persons who hunted waterfowl in 1960. Expenditures for this type hunting were \$89 million in 1960 compared with \$119 million in

The increase in the popularity of fishing and liunting is also noted in the number of households having at least one angler or nimrod. These increased from 17 million households in 1955 to 20 million in 1960.

In the population 18 years old and over in 1960, one woman in every 10 fished, one in every 69 hunted; and one man in every five hunted and one in every four fished.

Copies of the 1960 report are available through Superintendent of Documents, Government Printing Office, Washington 25, D. C. The price of the report is \$0.50. Its title is 1960 National Survey of Fishing and Hunting -Circular 120.

Harrisonburg News-Record Photo



This large black bear, weighing 392 pounds dressed, was shot November 25, 1961, by William J Wonderly, of Grottoes, near the Rockingham-Albemarle county line atop Ridge. The bear's live weight was estimated at 450 pounds.

Water Film

The dramatic comprehensive CBS television report, "Water Famine," is now available on a 55-minute film, free of charge, for use in school and adult groups. It may be obtained by contacting local Bell Telephone business offices.

Howard K. Smith narrates the film.



This interesting photo of a screech owl was taken by William Howard McConnell on his farm near Nickelsville in Scott County.



State Game Warden John Will Rives found this 17-pound bobcat killed by a car in Dinwiddie County on January 3.



Gizmo, a $3\frac{1}{2}$ -year-old pointer belonging to Prince Edward County Warden C. H. "Buck" Wells, really has a "rags to riches" background. The rags in this case were an expensive pair of curtains which the dog sneaked from a clothes-line and demolished. This, coupled with other puppy crimes, forced the original owner of Gizmo to give him away—to Warden Wells. After making his field trial debut at 27 months, Gizmo has placed in six out of eight field trials in which he has been entered bringing home three first, one second, and two thirdplace awards in addition to an honorable men-tion. Gizmo competes in the All Age Bird Hunter Stake Class.



Commission Photo by Kesteloo

John H. McLaughlin, formerly supervising game biologist in southwestern Virginia, was appointed staff assistant to the Executive Director and transferred from Roanoke to the Game Commission's office in Richmond on January 1, 1962. McLaughlin replaced former staff assistant Stuart P. Davey, who resigned on September 1, 1961. McLaughlin, who began work with the Game Commission in 1954 as district game biologist, was born in Hinton, West Virginia, and received his formal training in wildlife management at Virginia Polytechnic Institute after completing undergraduate work at the University of West Virginia. He became supervising game biologist in 1958.

Corrections For Release Table

Italicized figures on the ehart below indicate correct figures which should be substituted for incorrect figures in table on page 4 of the February 1962 issue: 1958 1959 1960 1961 No. Group 1B F-1 talis. 300 267 138 F-1 talis. 50 50 none

Tree Plantings Break Record

A record of 45,463,000 tree seedlings were planted in Virginia during the 1960-61 tree planting season, Virginia Forests Inc. has reported. This brings the number of seedlings planted since the 1916-17 season to a total of 298,-370,800.

The majority of the seedlings were loblolly pine, the organization said. Of the seedlings planted in the past season, 35,168,450 were grown in the State Forest Service nurseries at Providence Forge and Charlottesville.



Scottsburg Photo and Camera Shop Photo Kyle Dismuke of Scottsburg shows the 9-point, 160-pound buck he killed early on opening day of last hunting season in Halifax County to Halifax County game wardens Ralph Austin and Pete Cole.



Edited by JIM KERRICK

State Boating Administrators Seek Uniform Laws, Equipment, Markers

In an effort to eliminate much of the confusion now existing in various state and federal laws and regulations which govern the equipment and use of motorboats, officials of more than 30 states met with the U. S. Coast Guard and other officials of the federal government October 31 and November 1 in San Francisco.

There was agreement at this meeting as to a marking system for waterways. Other matters considered included the uniformity of equipment requirements between the States and the Federal Government; support by the group of Coast Guard efforts to achieve a uniform, single Rules of the Road (it was said there are seven now!); and minimizing regulation while standardizing and making uniform what regulation is found to be necessary. Standard markers agreed upon:



DIAMOND SHAPE with cross means BOATS KEEP OUT. Explanatory reasons may be indicated outside the crossed diamond shape, DAM, WATERFALL, RAPIDS, DOMESTIC WATER, SWIM AREA, etc.



DIAMOND SHAPE warns of DANGER. Suggested wording for danger includes ROCK, REEF, DAM, SNAG, DREDGE, WING-DAM, FERRY CABLE, MARINE CONSTRUCTION, etc.



CIRCLE marks CONTROLLED AREA "as indicated." Suggested wording for controlled or prohibited boating activity includes 5 MPH, NO FISHING, NO SKI, NO SWIM, NO SCUBA, NO POWER BOATS, NO PROP BOATS, SKI ONLY, FISHING ONLY, SKIN DIVERS ONLY, etc.



SQUARE OR RECTANGLE gives information, names, distances permitted, activities.



DIVER'S FLAG indicates presence of a diver. Flag has been adopted by Underwater Society of America for use during diving activities. Boaters are warned to keep away from flag area to avoid submerged divers.



ANCHOR BUOY. Prescribed buoy for permanent placing in any waters for use in anchoring or mooring water craft.



RED-TOPPED WHITE BUOY indicates boat should pass to south or west (cardinal system). BLACK-TOPPED WHITE BUOY indicates boat should pass to north or east (cardinal system).



RED-STRIPED WHITE BUOY indicates boat should not pass between buoy and nearest shore (cardinal system).

Approved Fire Extinguishers

Seven out of ten boat owners will have to put a new fire extinguisher aboard their boats this year. A recent U. S. Coast Guard regulation has banned the use of vaporizing liquid fire extinguishers since January 1, 1962.

These extinguishers have been banned because of their high toxicity.

If you still have this type of extinguisher aboard your pleasure boat, you may use it legally until the end of this year, provided it is workable and in good condition. But if you are purchasing a new boat which is required to carry fire equipment, then you must put aboard one of the approved types of fire extinguishers immediately.

The three approved types are:

- 1. Dry chemical, a powder that is non-toxic, non-abrasive and non-corrosive. It is rated by insurance rating agencies as having twice as much fire-killing power as other extinguishing agents, and has the added advantage of being able to be recharged at sea.
- 2. Carbon dioxide, a gas which has long been a standby on recreational boats. It is most effective when used in confined spaces. A five-pound CO2 extinguisher will put out only half as much fire as a comparable amount of dry chemical, after which it must be taken ashore to be recharged.
- 3. Foam, a frothy combination of chemicals which produce millions of tiny bubbles to smother the fire. Foam is widely used against flammable liquid fires ashore, but the size and bulk of its containers and the time required to apply it, make it somewhat impractical for recreational boats.

LETTERS

(Continued from page 3)

concern the proposal, "A prohibition against carrying a loaded firearm of any caliber upon the highway, or near it," and wonder if this could be a back door approach to restrictive firearms legislation.

If the intent of this proposal is to prohibit the taking of game from a vehicle, we do not need the legislation. We have a law (Va. Code 1919 & 4738) which prohibits shooting "in or along any road, or within 100 yards thereof." We also have a law which prohibits the shooting of any "game bird or game animal from an automobile or other vehicle." Perhaps we need the present laws enforced.

As the proposal is written, a "firearm of any caliber" would prohibit a responsible, law abiding citizen from having a loaded .38 caliber revolver in his car (not concealed within the meaning of the law) for self defense when driving at night along a lonely road. I cannot help recalling the tragic "Jackson Case" and similar crimes reported in the press during the past few years, and cannot believe that the VALC desires to disarm the citizens of our state by means of a so-called "game law." I do not believe that the Game Commission wishes to take unto itself the responsibility of prohibiting loaded firearms of all calibers. This, I feel, is a police power that, if needed, should be sponsored by the proper law enforcement agency of Virginia.

As a Hunter Safety Instructor I am aware of the great danger inherent in carrying a loaded rifle or shotgun in a vehicle. Such an act is a violation of basic firearms safety and one that should be prevented by education and prohibited by law. But, "a firearm of any caliber" is an entirely different matter. If firearms safety is the intent of the proposal I submit that a simple recommendation for legislation to prohibit the carrying of a loaded rifle or shotgun on the highways would suffice.

Robert C. Joerg, III Commander, USN (Ret.) Alexandria. Virginia

The VALC bill, drafted along less restrictive lines than was indicated in the editorial, read as follows: "\$33-287. If any person discharge or have in his possession a loaded rifle or a shotgun, with a shell in the chamber or magazine or both, in or along or on the right-of-way of any public highway, or in a street of any city or town, whether the town be incorporated or not, he shall, for each offense, be fined not less than five dollars. This section shall be enforced by State police, game wardens, and all other law enforcement officers." This bill was killed in committee—Ed.

AFTER reading your editorial in the January issue of Virginia Wildlife, we would like to voice our opinion on the present Louisa County laws.

In the spring of 1960, we attended a meeting of the Board of Supervisors of Louisa County. During this meeting, all people who were opposed to high-powered rifle hunting met in the Court House in a small room. During the meeting, the sportsmen who were hunting with rifles were asked to remain outside until the opposing party had their say.

After about one hour and 15 minutes, one of the supervisors came to the door and asked if we had anything to say. The spokesman in our behalf asked the opposing party to leave the room so we could get in. But they refused. Our spokesman had to stand in the doorway and have his say. During this time, Mr. O. L. Proffitt presented over 400 petitions, and facts and figures of court records of the low percentage of accidents by the so-called high-powered rifle, which were completely ignored. After about 15 minutes of interruption by the opposing party, the meeting was adjourned.

This is an example of some of our local politics. I think the Commission should step in and make such laws statewide, as to what the majority wants.

As for using buckshot, I think it is unsportsmanlike to shoot deer with it. This past season I know of at least four deer that were crippled by buckshot and were not found until after vultures had found them. A rifle would have killed these deer much quicker in the hands of a good shot.

As for an early small-game season, I do not approve of it. If the deer season is moved up any later than January 15, the hucks would not have any antlers. The season of 1960-1961 provided my party with four large bucks that had lost their antlers. Again, I will say that the Commission should govern the hunting regulations statewide, as to what the majority of people want.

Jones and Watson's Hunting Party Gordonsville By: John B. Watson Charlottesville, Virginia



More On Hunting Seasons

IN regard to Mr. Cutler's editorial in the October issue of VIRGINIA WILDLIFE, I am in favor of the Game Commission fixing the bag limits, length of seasons, "either sex" days for deer, etc., as they know best how to control our game population. But I believe the hunters should have a voice in selecting the opening dates so long as it would not interfere with the proper management of our game. Therefore, if a majority want an early small game season, we should have it. But I think our big game season should open no later than November 20, especially in our mountain counties, as the weather would too often interfere with a later season. Our enjoyment would he curtailed under adverse weather conditions. I also believe that with a December 1 opening date our deer herd would sometimes suffer on account of too few being Our game population, especially deer, has soared under the present management and seasons so why delay the opening date when the weather is almost daily threatening to "snow us under"?

I would like to recommend opening the hig game season west of the Blue Ridge as in the past (third Monday in November), and the small game season one or two weeks earlier.

Mont Phillips Nora, Virginia

PLEASE permit me to voice my opinion on an early hunting season. My vote would be "NO"; let the season stay just as it is. Despite the fact that most of the letters printed in the magazine are for it, there must he hundreds of hunters that are against it. Could it be that the Commission is for an early season is the reason that their letters are not printed? (We print em all.—Ed.)

In reading between the lines of most of these letters, it seems to me they all want to eat their cake and have it too. As it is now with all the season on all the game coming in at one time, they have to put out one and hunt that. If you gave an early season on small game as requested by the Virginia Wildlife Federation, don't you see what a drain it would be on all game? Hunters that now normally hunt one type of game would hunt all game as the season came in. Also it is usually too warm in October and the first of November to hunt in comfort in the eastern part of the state. Especially rabbit hunters. The dogs would soon play out in warm weather. After all, hunting is an outdoor sport and if one can't stand cold weather he should take up checkers or some indoor sport.

And as far as deer hunters bothering other types of hunting. I do not agree. I hunt rabbits and squirrels right in the immediate area of three different gangs of deer hunters, and I haven't been bothered by them at all. According to some of the letters in your forum, one would think that deer dogs cover an area like an army regiment. All types of hunting are bound to cross one another now and then, but no great harm is done and with a little patience your particular kind of game will still he there.

John G. Lyons Richmond, Virginia

History Of The Skyline Drive

I ENJOYED your October issue article entitled "Blue Ridge Parkway" as I do many articles in your magazine. I wonder if you could give the Skyline Drive similar treatment in a future issue. When I was assistant extension forester some 10 years ago, it seems to me that J. Wilbur O'Byrne told me that a committee was appointed by the Governor of Virginia to buy the necessary land which was then donated to the U. S. government by the state of Virginia for the purpose of establishing a park and driveway. My memory is not good, however, and some compilation of this information in an article would seem to me to he of interest to many others than my-self.

John W. East Arlington, Virginia

The Secretary of the Interior appointed a Southern Appalachian National Park Committee in 1924 to survey the Blue Ridge and other eastern regions for a future national park within reach of the East's population centers. Mr. George Freeman Pollock, who owned one of the most scenic portions of the Blue Ridge called "Skyland," suggested that his land, together with adjacent tracts, be used for a national park. The Shenandoah National Park Association, formed in 1925, raised \$1,249,000 in nine months via pledges from 24,000 Virginians to buy the necessary property at six dollars an acre. The Virginia General Assembly voted an additional million dollars to help buy the 3,870 private tracts, and in 1926 Congress authorized establishment of the park. The first section of Skyline Drive was opened in 1934, and President Franklin D. Roosevelt formally dedicated the park in an address at Big Meadows on July 3, 1936. See page 12 of this issue for an article on Virginia's national parks by Park Service Regional Director Elbert Cox.-Ed.

Gathright Dam Pros and Cons

THE construction of a dam on the Jackson River, above Covington, Virginia, by the U. S. Corps of Engineers, which would flood approximately 4.000 acres of the Gathright Wildlife Management Area, would be a great blow to many sportsmen as well as destroying some of the best game habitat in the state of Virginia. Our land for hunting is fast disappearing because of projects of this kind. Why can't this one be preserved? We feel that this wildlife management area is much more valuable to the state than a water development project. We feel that there are too many of these projects now and too few wildlife areas.

Sportsmen are spending \$80 million a year in the state of Virginia, and projects of this kind, destroying wildlife habitat, will also eliminate much of this spending, not to mention the sport and excitement it affords the hunters and fishermen. We, therefore, agree with the editor of VIRGINIA WILDLIFE, Mr. M. Rupert Cutler, in saying, "Yes, we want no Gathright Dam."

Earl L. Steele, President Collinsville Sportsmen Cluh Collinsville, Virginia

I WOULD like to point out errors of fact in your December editorial.

You say the project was authorized in 1946 but "funds were never appropriated." This is not correct. In 1952 and '53 \$170,000.00 was appropriated for this project.

You say "a study by the Corps in 1949 concluded that the project could not be economically justified." This is not correct. The 1949 study showed that the project was justified. It was in 1953, and only after changes in administrative regulations setting up an entirely new set of ground rules, that the project was never thrown out by lack of merit, but by these changes in administrative regulations.

You say that 4,000 acres of the Commission's land would be flooded by the dam. This is not correct. Of the 3,850 acres which would be flooded, only about 3,000 acres of the Commission's land would be flooded. The remaining 850 acres would he on other owners' land.

You say "public power and other interests are clamoring for construction of the Gathright Dam." This is not correct. The only forces working with us which have the slightest interest in public power are the

R.E.A. Cooperatives. The overwhelming interest working for the project is the James River Basin Association. It would be hard to find a more conservative group.

You say "proponents of the project claim it would relieve unemployment." While any employment would be most welcome, the amount of employment, except during the construction period, would be negligible. The permanent long range values are our objective. Also, there are not "depressed areas" in the James River Basin.

You cite unit costs of \$130 per K.W. for steam power as against \$500 for hydro at the dam. This is not a fair comparison. It is well known that steam plants constantly require fuel which hydro plants do not, and that maintenance and depreciation costs are higher. Moreover, hydro plants are operated for the production of "peak power." A steam plant that would run only four to six hours a day would skyrocket its costs.

You cite the drainage area of 3% as evidence that the Gathright Dam would be ineffective for flood control. Surely this is specious argument. Nobody has ever claimed flood control benefits further downstream than Lynchburg. The dam would control 78% of the drainage area above Covington, and 10% of the drainage area above Lynchburg. There are over \$100.000.000.00 of value on the flood plain from the Dam through Lynchburg. Ten percent reduction in the crest of any known flood at Lynchburg would have prevented the extensive damage that occurred in previous years.

You state that the dam would have a maximum drawdown of 99 feet. The original study published in 1945 did consider that a succession of dry seasons which might occur once in fifty years would result in such a



drawdown. However, the renewed studies in 1953 calculated a maximum drawdown of only 59 feet in the driest periods of record. The drawdown in other years would be much less. It is believed that the drawdown during the recreation season—May to September—would not exceed 20 feet, and a restudy might show even less than this.

You say "its level must be kept low during wet seasons to catch and hold possible floods caused by rains and snows." It is generally known that the program calls for keeping the "pewer pool" as full as possible at all times. On top of the "power pool" would be the "flood pool" designed to contain the greatest flood of record, which would be kept empty at all times except when needed to contain a great flood. "Flood control" would not affect power production to any great extent.

You cite the Public Health Service as an argument against the value of pollution abatement. In 1953 the Public Health Service made the following statement about the Gathright Dam:

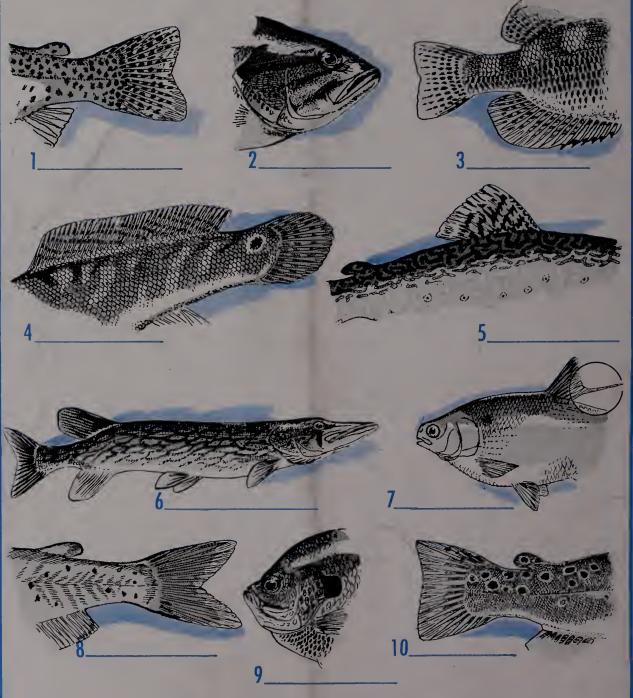
"Low-flow regulation is a very important part of a comprehensive program of pollution abatement on the Jackson and upper James Rivers. Together with a general program of waste treatment and other measures aimed at reducing the pollution load, flow regulation can increase the usefulness of the James River for public water supplies, for agricultural and industrial use, for recreation, and for wildlife conservation."

Also, I cannot let pass your derogatory reference to the Army Engineers. As an engineer I have had considerable contact with these gentlemen over many years. They command the respect of engineers everywhere as a competent, high class organization, and I have always found them to be so.

W. Martin Johnson, President James River Basin Association Lynchburg, Virginia

Funds have never been appropriated for construction of this project, which, in 1953, would have cost \$64,050,000 to complete (Corps figures). Whether or not the project was ever justified is a matter of opinion. It became less valuable when downstream industries reduced the river's pollution load. According to the last study, 93 percent of the project's value was attributed to hydroelectric power generation. Inasmuch as Virginia Electric and Power Company is building its Gaston project on the Roanoke River in North Carolina for low load factor ("peak") power and Appalachian Power Company is completing its Smith Mountain project on the Roanoke River in Virginia for the same purpose, and inasmuch as Vepco will have completed a 500,000 kilowatt, 350-mile transmission loop through northern Virginia from a coal mine in West Virginia by 1966, neither of the existing large utilities in the area would be interested in adding power from Gathright to their systems; it could conceivably be unsaleable. The most recent design for the Gathright Dam pegs the maximum power pool elevation at 1.731 feet and the maximum headwater at 1,770 feet. These pools would be, respectively, 7,000 and 9,000 surface acres in size. R.E.A. Cooperatives are public power interests; the federal government loans them money at a two percent interest rate and the federal R.E.A. administrator controls their operations. Only those members of the James River Basin Association from Covington and Lynchburg have really been pushing this project; the enthusiasm isn't unanimous. The flood control features of the dam design have been exaggerated to increase calculated benefits; while the project would be designed to hold 140,000 cubic feet per second, the maximum known flood of record at the site (1936) was only 24.700 c.f.s. Flood control, on the other hand, takes a back seat to power generation at Corps-operated power dams. During floods, water is let downstream at the maximum discharge rate of the turbines, and flood waters remaining are kept in the reservoir for later power generation, not released to make way for another flood. The effectiveness of pollution dilution depends upon whether or not the poisons are mixed with the clean water through stream turbulence.—Ed.

What Fish is This



Answers: (1) Rainbow Trout, (2) Smallmouth Bass, (3) Rock Bass (Redeye), (4) Bowfin (Grindle), (5) Brook Trout, (6) Chain Pickerel, (7) Gizzard Shad, (8) Channel Catfish, (9) Bluegill, (10) Brown Trout